Malheur Invasive Plan Project

Wildlife Report and Biological Evaluation

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For the
Malheur National Forest

Date: April 25, 2014

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Introduction

The Malheur National Forest (MNF) provides diverse habitats for wildlife including grasslands, sagebrush and juniper; fir and pine forests and mountain lakes and meadows. These varied habitats provide for a diversity of wildlife including 365 vertebrate species including 22 fish, 9 amphibians, 14 reptiles, 235 birds and 85 mammals (Forest Plan p. III-42). Invasive plants have become established and continue to spread, causing a loss of wildlife habitat and posing a risk of injury to wildlife on the Malheur National Forest (MNF). This analysis addresses the impacts and benefits of the proposed MNF Invasive Plants Treatment Project on wildlife and wildlife habitat.

Project Area Description

The Malheur National Forest is located in the Blue Mountains in northeastern Oregon and encompasses nearly 1.7 million acres and hereafter is referred to as the project area. The main counties included in the project area are Grant, Baker and Harney. Small portions of Crook and Malheur Counties are also included in the analysis.

The project area is located approximately an equal distance from the borders of Washington, Idaho, and Nevada. The Strawberry Mountain Range, part of the Blue Mountains, extends east to west through the center of the Forest. This range splits the Forest into two geologic provinces, the Columbia Basin to the north and the Great Basin to the south. The project area is bordered by the Wallowa-Whitman National Forest on the east, the Umatilla National Forest on the north, and the Ochoco National Forest on the west. Elevations on the Forest vary from less than 4,000 feet to greater than 9,000 feet on Strawberry Mountain.

The northern part of the Forest is drained by the John Day River System into the Columbia River Basin. The southern part of the Forest is drained principally by the Silvies River System into the Great Basin, and by the Malheur River System into the Snake River. The Forest provides timber and other wood products, water, recreation, and supports a large Rocky Mountain elk herd, two designated wilderness areas covering 81,970 acres, and nineteen inventoried roadless areas totaling 188,904 acres (USDA 1990a).

Project area lands provide diverse habitats for wildlife including grasslands, sagebrush and juniper; fir and pine forests and mountain lakes and meadows. These varied habitats provide for a diversity of wildlife including 365 vertebrate species including 22 fish, 9 amphibians, 14 reptiles, 235 birds and 85 mammals (Plan III-42).

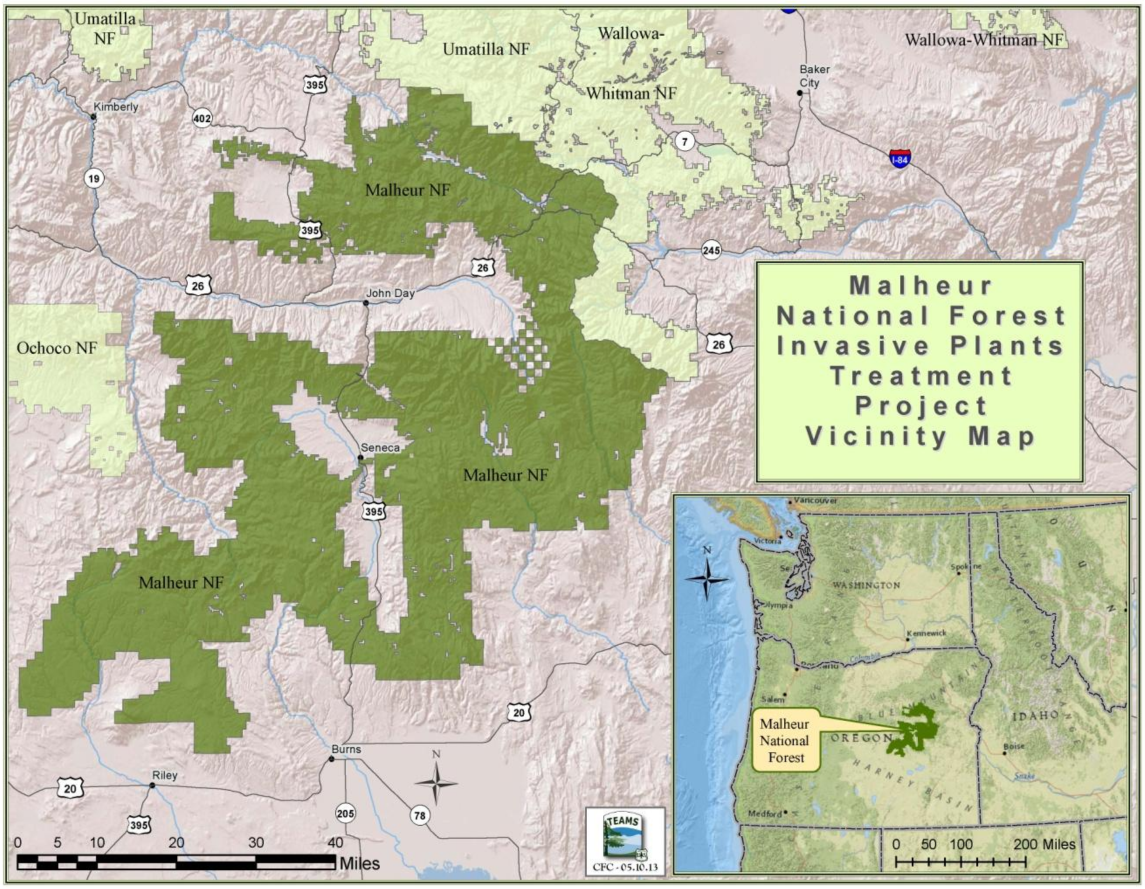

Figure 1: Malheur invasive plant vicinity map

Regulatory Framework

The following is a summary of regulatory direction specifically applicable to the management of wildlife resources on the project area

- National Environmental Policy Act (NEPA) of 1969 (as amended) – NEPA requires that effects of management actions on wildlife be disclosed and that management provide for a diversity of plant and animal communities (16 USC 1604((g)(3)(B))

- Endangered Species Act (ESA) of 1973 (as amended) - ESA requires the Forest Service to manage for the recovery of threatened and endangered species and the ecosystems, upon which they depend. Forests are also required to consult with the US Fish and Wildlife Service if a proposed activity may affect the population or habitat of a listed or proposed species.

- National Forest Management Act (NFMA) of 1976 (as amended) - NFMA requires the Forest Service to manage fish and wildlife habitat to maintain viable populations of all native and desirable non-native vertebrate wildlife species and conserve all listed threatened or endangered species populations (36 CFR219.19).

- Executive Order 13186 (Migratory Bird Treaty Act) - The MBTA established an international framework for the protection and conservation of migratory birds. This Act makes it illegal, unless permitted by regulations, to "pursue, hunt, take, capture, purchase, deliver for shipment, ship, cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird." Within the NEPA process, effects of proposed actions on migratory birds will be evaluated and actions will consider approaches to identify and minimize take (USDA FS 2008a).

- Forest Service Manual Direction regarding wildlife (FSM 2600) - Forest Service Manual direction provides guidance related to Threatened, Endangered and Sensitive (TES) species. It requires that the Forest Service identify and prescribe measures to prevent adverse modifications or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened and proposed species (FSM 2670.31 (6)). It also requires the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern (Under FSM 2670.32) and mitigate adverse impacts of management activities (FSM 2634).

Forest Plan Direction

The Malheur (USDA-FS 1990a) and Ochoco (USDA-FS 1989) Land and Resource Management Plans provide overriding direction related to wildlife management on the Forest. The following is a summary of wildlife related goals and management prescriptions related to wildlife that could be affected by invasive weeds or their treatment.

Goals and Objectives

- Provide a diversity of habitat sufficient to maintain viable populations of all species (USDA-FS 1990a p IV-2 & IV-45, USDA FS 1989 p. 4-37). Maintain native, historic and introduced plant and animal species and communities, including those that may be threatened, endangered or sensitive (USDA 1989 p. 4-3).

- Manage big-game habitat to achieve a sustained capability level over time which supports elk and mule deer population levels by Oregon Department of Fish and Wildlife. This should be achieved through management of cover, forage quality, quantity and distribution, as well as road use (USDA-FS 1990a p IV-2 and 16).

- Plan and design all management activities to avoid actions which may cause a species to become threatened or endangered. Critical habitats and other habitats necessary for the conservation of these species will not be destroyed or suffer adverse modification. All actions will be coordinated with other agencies as appropriate (USDA-FS 1990a p. IV-17).

- Manage bald eagle winter roosts in accordance with the Pacific States Bald Eagle Recovery Plan and in a manner which encourages use by bald eagles. Monitor known roosts for use or potential use in March and April (USDA-FS 1990a p. IV-17).

- Manage habitat of candidate species for listing as threatened or endangered in cooperation with the U.S. Fish and Wildlife (USDA-FS 1990a p. IV-17).

- Uplands will be managed to utilize available forage while maintaining vegetation and site productivity (page IV-18).

- Riparian areas will be managed to protect or enhance the value for water quality, fish habitat and wildlife (page IV-19).

- Maintain the health of the Forest for present and future uses, within management's ability to do so. Prevention and control damage to forest resources, caused by insects, diseases, and noxious weeds will be accomplished through a number of practices (USDA 1989 p 4-12).

- Provide forage for wildlife and domestic livestock in a manner consistent with other resource objectives and environmental constraints, while maintaining or improving ecological condition and plant community stability (USDA 1989 p. 4-11).

- Provide stands of old growth throughout the Forest for wildlife habitat, ecosystem diversity, and aesthetic diversity (USDA 1989 p. 4-20).

Management Area Direction

- Management Area 4a (big game winter range) - Manage to maintain usable forage for elk and deer on potential winter range (IV-47).

- Management Area 13 (old growth) – Manage old growth for wildlife and plant habitat, ecosystem diversity, and aesthetic quality (Plan IV-48).

- Management Areas 20B and 21 (Wildlife Emphasis Areas) – Manage to provide for high quality fish and wildlife habitat and water quality. Manage elk habitat to provide at least 70% of elk habitat effectiveness. Provide necessary habitat to contribute to Forest-wide maintenance of viable populations of management indicator and featured species and develop strategies to promote a variety of species including those dependent upon old growth, riparian, and solitude. (Plan IV-121 and IV-126).

- Management Area F5 (RNA's) – Any management activities within the RNA's will be directed at maintaining the natural conditions of the area. Human-caused changes to the ecosystem will not be readily evident (USDA 1989 p. 4-57).

- Management Area F6 (old growth) – Provide habitat for wildlife species dependent on old growth stands (USDA 1989 p. 4-58).

- Management Area F12 (Eagle Roosting Areas) – The area will be free of potentially disturbing human activity in the vicinity of roosting areas between December 1 to May 1 (USDA 1989 p. 4-70).

- Management Area F20 (Winter Range) – Manage for big game winter range habitat. Treatments will be prescribed to maintain key forage and browse species (USDA 1989 p. 4-83).

- Management Area F21 (General Forest Winter Range) – Areas of particular importance as big game habitat will be identified and management activities modified to complement, protect or improve habitat (4-86). A variety of native grasses, sedges and forbs will be available and most forested range lands will be in fair to good forage condition class (USDA 1989 p. 4-87).

- Management Area F22 (General Forest) – Produce timber and forage while meeting the Forest-wide standards and guidelines for all resources (USDA 1989 p. 4-86).

Forest Plan Standards

Forest Plan Standards (USDA-FS 1989, USDA-FS 1990a) that apply to invasive weed treatments or encroachment by invasive plants on wildlife habitat include the following:

Wildlife Habitat

- Utilize road and/or area closures to achieve the specific wildlife habitat management objectives of individual management areas (USDA-FS 1990a p.IV-29).
- Maintain dead tree (snag) and woody debris habitat standards (USDA-FS 1990a p. IV-29 to IV-30).
- Protect and enhance sagebrush habitats with documented use by sage grouse or high potential for use. Coordinate with other resource uses and the Oregon Department of Fish and Wildlife (DFW) (USDA-FS 1990a p. IV-31).
- Maintain the integrity of unique habitats including meadows, rimrock, talus slopes, cliffs, animal dens, wallows, bogs, seeps and springs by incorporating cover buffers approximately 100 ft. in width. Utilize additional mitigation enhancement measures identified through project level analysis (USDA-FS 1990a p. IV-31).
- Maintain the openness that is characteristic of antelope habitat by controlling the invasion of trees identified through project level environmental analysis (USDA-FS 1990a p. IV-31).
- Protect and enhance occupied habitats of upland sandpipers that are critical to nesting and rearing of young. Cooperate with other agencies and groups in determining habitat use areas (USDA-FS 1990a p. IV-31).
- Maintain the openness that is characteristic of bighorn sheep habitat. Review all activities within prime habitat, including migration routes, to identify and mitigate human disturbance (USDA-FS 1990a p. IV-31).
- Manage and protect wildernesses in a manner that allows ecological processes, succession, fire and similar influences to play a role (USDA-FS 1989 p 4-121).
- Protect fragile sites such as shallow soil areas and natural meadows (USDA-FS 1989 p 4-121).
- Encourage recovery or prevent deterioration of native plants or plant communities by undesirable weedy, annual or noxious vegetation (USDA-FS 1989 p 4-121).
- Control noxious weeds and invader plants to prevent threats to adjacent agricultural lands or to prevent unacceptable loss of range productivity (USDA-FS 1989 p. 4-148).
- Protect seeps, springs, bogs and wet areas and any other unique habitats often or generally less than 10 acres in size. (USDA-FS 1989 p.4-250).

Management Indicator Species

- Provide habitat requirements for Management Indicator Species (MIS) (USDA-FS 1990a p. IV-32).

- For MIS, determine if the species' use of the area is incidental or if it is essential habitat. If it is determined be essential habitat (e.g. roost sites), protect it from adverse modification through curtailment of conflicting activities (USDA-FS 1989 p. 4-242).

Big Game

- Protect the character of elk calving sites and prevent harassment in designated calving areas. Minimize disturbance from human activity and restrict off-highway vehicles and other motorized use to designated roads and trails during the calving season. Also protect wallows during the rutting season (September 1 to October 15) (USDA-FS 1989 p.4-246, USDA FS 1990a p. IV-29).

- Provide forage sufficient to meet management objectives for population levels of Rocky Mountain elk and mule deer (USDA-FS 1989 p.4-246).

- Use of motorized equipment is restricted to open roads from December 1 to May 1 in MA's F20 and F21 and all other winter range areas (USDA-FS 1989 p. 4-147).

- Use of motorized equipment is prohibited in MA F5 and F6, except in connection with approved research projects (USDA-FS 1989 p 4-121).

Birds of Prey

- Protect active bird of prey nests from human disturbance until nesting, feeding and fledging are completed. Provide protection of nest sites and nesting habitat sufficient for the species involved (USDA-FS 1989 p.4-248).

- Maintain the nest trees of active raptor nests and habitat immediately surrounding, and mitigate potential adverse impacts from management activities during the nesting season. Mitigation measures will be developed based on site characteristics and biological needs of the species. Where possible, retain trees with inactive nests that may be important to secondary nesters (USDA-FS 1990a p. IV-31).

- For all species except prairie falcon restrict human activities within 660 ft. of nest sites between March1 and August 1.

- For prairie falcons restrict human activities from March 1 to August 1 within 1000 ft. of nests (USDA FS 1989 p. 4-249). Evaluate activities having the potential to alter or disturb cliffs, talus or cave habitats (USDA-FS 1989 p.4-245).

- Protect every known active and historically used goshawk nest site from disturbance. Historical refers to known nesting activity occurring at the site for the last 5 years. Seasonal restrictions on activities near nest sites will be required for activity types that may disturb or harass pair while bonding and nesting (USDA-FS 1995 p. 10).

Bald and Golden Eagles

- Refer to the Pacific Bald Eagle Recovery Plan for protection of bald and golden eagles. Upon discovery of an active nest, suspend all management activities that could alter site characteristics or disturb birds until the nest site is evaluated (USDA-FS 1990a p. IV-31).

- Evaluate activities having the potential to alter or disturb cliffs, talus or cave habitats (USDA FS 1989 p. 4-4-425).

- Nesting sites, and roosting sites used in conjunction with nesting sites will be protected under the Bald and Golden Eagle Protection Act (USDA-FS 1989 p. D-109). Human activities should be controlled between March 1 and August 15th within ½ mile of nests (USDA-FS 1989 p.4-248).

Alternatives Considered

Alternative B (Proposed Action)

The proposed action is an integrated approach to suppress contain, control, or eradicate invasive plants. That is, treatments would be a combination of herbicides, biological agents, mechanical and manual techniques. Cultural/restoration treatments such as mulching, competitive seeding, or planting with native species would be implemented when needed to facilitate natural plant recovery. Existing and new infestations would be treated, including potential new target invasive plant species that currently are not found on the Forest.

Alternative B responds to the purpose and need for action by authorizing several herbicides and other integrated treatment methods to be implemented on the MNF over the next 5 to 15 years. These options are intended to effectively reduce the size and density of invasive sites and abate the adverse effects of invasive plants. The project would continue to be implemented each year until the treatments were no longer needed or conditions substantially change on the ground to such a degree that the analysis in this EIS is no longer valid.

Aminopyralid would be used for the first year or so of treatment for about 1,350 acres (64 percent of the total infested acreage). This herbicide is likely to be the most effective of the eleven available herbicides for 13 of the 18 primary target species (all except houndstongue, toadflax, pepperweed and whitetop, which have chlorsulfuron as the first choice herbicide; and sulphur cinquefoil, that has metsulfuron methyl as the first choice herbicide). Other effective herbicides could be used as needed over time, depending on whether the first year's choice proved effective.

The types of treatments proposed under alternative B are summarized in table 1.

Treatment Type

Table 1: Alternative B proposed treatment methods

Treatment Method	Description
Manual	Includes hand pulling or using hand tools (e.g., grubbing), to remove plants or cut off seed heads. Handsaws, axes, shovels, rakes, machetes, grubbing hoes, mattocks, brush hooks and hand clippers may be used to manually remove invasive plants. Other manual methods could include hot water steaming, and solarization techniques such as using black plastic to cover invasive plants to shade out and kill pieces of roots (i.e. rhizomes). These techniques could be used where minimizing herbicide use is desirable such as streambanks or near sensitive plant populations.
Mechanical	Mechanical methods use power tools and include such actions as mowing, weed whipping, road brushing, and root tilling. These activities would typically occur along roadsides, rock sources, or other confined disturbed areas and dispersed use areas. Mowing and cutting would be used to reduce or remove above ground biomass. Seed heads and cut fragments of species capable of re-sprouting from stem or root segments would be collected and properly disposed of to prevent them from spreading into non-infested areas.

Treatment Method	Description
Biological Agents	Biological agents are parasitic insects, mites, nematodes, and pathogens that feed on specific parts of invasive plants and inhibit their growth and spread. In some situations, a suite of biological control agents is needed to reduce weed density to a desirable level. For instance, a mixture of five or more biological control agents may be needed to attack flower or seed heads, foliage, stems, crowns and roots all at the same time or during the plant's life cycle. Typically 15 to 20 years are needed to suppress or contain an established population of invasive plants. Agents approved by the Animal and Plant Health Inspection Service (APHIS) that are proven natural control agents of specific invasive species but do not harm other species may be released.
Cultural Methods/ Restoration	Cultural controls are defined in the R6 2005 FEIS as: "The establishment or maintenance of competitive vegetation, use of fertilizing, mulching, or prescribed burning, or grazing animals to control or eliminate invasive plants". In this project, the following cultural treatments are not included: livestock grazing, burning, tilling, plowing and mechanical seed drilling. Mulching, seeding, planting would be used to encourage native plant survival and re-establishment, speed reoccupation of a site by native vegetation, and provide erosion protection. Restoration of native plant communities through mulching, seeding or planting would be likely to occur as a follow up to invasive plant treatment in areas where passive restoration is not sufficient. This will be determined as a part of each treatment prescription. The 1,281 acres that are of a size and configuration to potentially warrant broadcast spraying are assumed to need some sort of restoration in this analysis. Please note that passive restoration could be sufficient in many of these areas, or restoration could be needed elsewhere. Passive restoration may include keeping cattle away from treated areas until the area has recovered and contains desirable vegetation.
Herbicide Application: General	Herbicides would be used to contain, control and eradicate invasive plants that are not cost-effectively treated by other methods. When herbicide use is proposed to occur in or near sensitive areas, specific design features would be used to insure that vegetation treatments do not have an adverse impact on non- target plants or animals. Herbicide treatments, chemical mixing, spill prevention, and clean up would be done in accordance with Forest Service policies, plans and product label requirements.
Herbicide Application: Broadcast Spraying	Broadcast application means that herbicide is applied to a continuous population of invasive plants. This method is used when the weed is dense enough that it is difficult to discern individual plants and the area to be treated makes spot spraying impractical. Larger and denser infestations may require a broadcast spray. In cases where the invasive plant covers more than 70 percent of an area that is bigger than 0.1 acre, broadcasting may be the most cost-efficient method. The most ambitious conceivable situation would be all currently infested areas become 100 percent covered with invasive plants, which would require the full amount of herbicide to be broadcast on each acre at a typical rate. Using this assumption, for this analysis about 1,281 acres would meet the criteria for broadcast spraying under Alternative B. Many Project Design Features are proposed to avoid drift and other risks sometimes associated with broadcast spraying. Broadcast spraying using most of the 11 eleven herbicides is not allowed near streams (with the exception of aminopyralid which poses little to no risk to the aquatic environment).
Herbicide Application: Spot and Selective Spraying	Selective application targets individual plants. Herbicide is usually applied by hand. Spot spraying targets clumps of plants. Herbicide is usually applied with a backpack sprayer or other hand pump system. Spot spraying is also done using a hose off a truck-mounted or ATV-mounted tank. The most ambitious conceivable situation would be that all currently infested areas become 100 percent covered with invasive plants. However, the size of these infestations would not require broadcast treatment, so under this scenario about 843 acres would be treated using selective or spot application methods.

Herbicides

In addition to biological, mechanical and manual treatment the proposed action includes the use 11 herbicides to treat 18 invasive weed species on 2,124 acres of mapped infestation. Table 1 summarizes treatment methods proposed under the proposed action, whereas table 2 displays the target species, acres of infestation and preferred herbicides. First choice herbicides include those that are most effective and contain the fewest potential risks to non-target species. For example, we would use aminopyralid (trade name milestone) for the first year or so of treatment since it is the first choice herbicide for about 1,350 acres (64 percent of the total infested acreage), because the risk assessment completed in 2007 indicates that this herbicide will increase treatment effectiveness for 13 of the 18 species and decrease risk of adverse effects as compared to other herbicides authorized in the R6 2005 ROD (USDA FS 2005b). Chlorsulfuron is the first choice herbicide on 591 acres (28 percent) and metsulfuron methyl is preferred on 186 acres (eight percent). We would use the other effective herbicides as needed over time, depending on the effectiveness of the first choice.

Table 2: Alternative B Common Control Herbicides

Target Species	Spatial Extent		First Choice Herbicide	Other Effective Herbicides
	Sites	Acres		
Yellow star-thistle	3	1	aminopyralid	Clopyralid, glyphosate, picloram
Common Johnswort	185	20	aminopyralid	Glyphosate, metsulfuron methyl, picloram
Sulphur cinquefoil	61	186	metsulfuron methyl	Glyphosate picloram, triclopyr
Russian knapweed	43	2	aminopyralid	Clopyralid, chlorsulfuron, glyphosate, imazapyr, metsulfuron methyl, picloram
Spotted knapweed	171	82	aminopyralid	Clopyralid, glyphosate, triclopyr, picloram
Diffuse knapweed	213	74	aminopyralid	Clopyralid, glyphosate, triclopyr, picloram
Squarrose knapweed	3	0.3	aminopyralid	Clopyralid, glyphosate, triclopyr, picloram
Meadow knapweed	2	0.2	aminopyralid	Clopyralid, glyphosate, triclopyr, picloram
Canada thistle	1,277	1,021	aminopyralid	Clopyralid, chlorsulfuron, picloram
Bull thistle	0	0	aminopyralid	Clopyralid, chlorsulfuron, glyphosate, triclopyr, picloram
Scotch thistle	61	23	aminopyralid	Clopyralid, chlorsulfuron, glyphosate, triclopyr, picloram
Musk thistle	13	11	aminopyralid	Clopyralid, chlorsulfuron, glyphosate, triclopyr, picloram
Leafy spurge	14	10	aminopyralid	Glyphosate, imazapic, picloram
Houndstongue	171	340	chlorsulfuron	Metsulfuron methyl, imazapic
Dalmatian toadflax	666	155	chlorsulfuron	Metsulfuron methyl, imazapic, picloram
Yellow toadflax	27	9	chlorsulfuron	Metsulfuron methyl, imazapic, picloram
Whitetop	148	85	chlorsulfuron	Metsulfuron methyl, glyphosate, imazapic, imazapyr
Perennial pepperweed	12	2	chlorsulfuron	Metsulfuron methyl, glyphosate, imazapic, imazapyr, sulfometuron methyl
Total	**3,070**	**2,124**		

The lowest effective herbicide concentration will be applied. Maximum application rates may be used if necessary in small areas, but in general, spot and broadcast treatments will use typical or lower application rates.

Project Design Features

Project Design Features (pdfs) were developed to minimize potential impacts to non-target wildlife and plants, soils, water quality, areas of interest (e.g. roads and trails, recreation sites, wilderness/wild and scenic rivers, and wildland fire areas. These pdfs are mandatory and provide sideboards for treatment of known sites, along with new detections. The effects analysis presented in this report assumes implementation of pdfs identified in table 3.

Table 3: Project Design Feature Summary

PDF Reference	Design Features	Purpose of PDF	Source of PDF
B – Coordination with Other Landowners/Agencies			
B1	Coordinate treatments on neighboring lands and within municipal watersheds. For neighboring lands, base distances on invasive species reproductive characteristics, and current use.	To ensure that neighbors are fully informed about nearby herbicide use and to increase the effectiveness of treatments on multiple ownerships.	A variable distance based on site and species specific characteristics was chosen because it adjusts for various conditions that exist in these areas. All pdfs related to riparian areas and buffer distances will be followed.
C – To Prevent the Spread of Invasive Plants During Treatment Activities			
C1	Ensure vehicles and equipment (including personal protective clothing) does not transport invasive plant materials.	To prevent the spread of invasive plants during treatment activities	Common measure.
D – Wilderness Areas[1]			
D1	No solarization, mechanical or motorized treatments will occur in wilderness areas. Herbicide use would be approved by the Regional Forester via a pesticide use proposal.	To maintain wilderness values, e.g., solitude, unimpeded natural processes—and comply with environmental laws and policies.	Wilderness Act, 1990 Malheur National LRMP
E – Non-herbicide Treatment Methods			
E1	Treatments implemented below the ordinary high water mark will be applied from the bank and workers will not walk in flowing streams regardless of treatment method.	To reduce the likelihood of causing negative impacts to fish and fish habitat.	Memorandum of Understanding between WDFW and USDA Forest Service, January 2005.
E2	Fueling of gas-powered equipment with tanks larger than 5 gallons would generally not occur within 150 feet of surface waters. Fueling of gas-powered machines with tanks smaller than 5 gallons may occur up to 25 feet of surface waters.	To protect riparian and aquatic habitats.	Common Measure
F – Herbicide Applications			
F1	Alkylphenol ethoxylate-based non-ionic (NPE) and ethoxylated fatty amine (POEA) surfactants would not be used. Vegetable oils/silicone blends that contain alkylphenol ethoxylate ingredients may be used.	To reduce risks associated with surfactants	SERA and Bakke risk assessments

[1] Invasive plant eradication within Wilderness meets the "no impact" intent of the Wilderness Act and associated land use policies.

PDF Reference	Design Features	Purpose of PDF	Source of PDF
F2	The least amount of a given herbicide would be applied as necessary to meet control objectives. In no case will imazapyr use exceed 0.70 lbs. a.i./ac. Broadcast application of Clopyralid, Glyphosate, Picloram, Sethoxydim, or Sulfometuron methyl will not exceed typical rates across any acre. Spot spray of triclopyr would not exceed typical rates across any acre.	To minimize herbicide exposures of concern to human health.	SERA and Bakke risk assessments
F3	Broadcast herbicide applications would occur when wind velocity is between two and eight miles per hour to reduce the chance of drift. During application, weather conditions would be monitored periodically by trained personnel.	To ensure proper application of herbicide and reduce drift.	These restrictions are typical so that herbicide use is avoided during inversions or windy conditions.
F4	To minimize herbicide application drift during broadcast operations, use low nozzle pressure; apply as a coarse spray, and use nozzles that minimize fine droplet spray, e.g., nozzle diameter to produce a median droplet diameter of 500-800 microns.	To ensure proper application of herbicide and reduce drift.	These are typical measures to reduce drift. The minimum droplet size of 500 microns was selected because this size is modeled to eliminate adverse effects to non-target vegetation 100 feet or further from broadcast sites (see chapter 3 for details).
F5	No use of sulfonylurea herbicides (chlorsulfuron, sulfometuron methyl and metsulfuron methyl) on dust-laden bare soils. Avoid bare areas >100 sq. ft. with powdery, ashy dry soil, or light sandy soil.	To avoid potential for herbicide drift.	Label advisory
F6	When herbicides are applied, a non-toxic blue dye will be used to mark treated areas.	To ensure treated areas are obvious to people and prevent accidental ingestion by plant collectors.	Common measure

PDF Reference	Design Features	Purpose of PDF	Source of PDF
G Herbicide Transportation and Handling Safety/Spill Prevention and Containment ▪ An *Herbicide Transportation and Handling Safety/Spill Response Plan* would be the responsibility of the herbicide applicator. At a minimum the plan would: ▪ Address spill prevention and containment. ▪ Estimate and limit the daily quantity of herbicides to be transported to treatment sites. ▪ Require that impervious material be placed beneath mixing areas in such a manner as to contain small spills associated with mixing/refilling. ▪ Require a spill cleanup kit be readily available for herbicide transportation, storage and application (minimum FOSS Spill Tote Universal or equivalent). ▪ Outline reporting procedures, including reporting spills to the appropriate regulatory agency. ▪ Ensure applicators are trained in safe handling and transportation procedures and spill cleanup. ▪ Require that equipment used in herbicide storage, transportation and handling are maintained in a leak proof condition. ▪ Address transportation routes so that traffic, domestic water sources, and blind curves are avoided to the extent possible. ▪ Specify conditions under which guide vehicles would be required. ▪ Specify mixing and loading locations away from water bodies so that accidental spills do not contaminate surface waters. ▪ Require that spray tanks be mixed or washed further than 150 feet of surface water. ▪ Ensure safe disposal of herbicide containers. ▪ Identify sites that may only be reached by water travel and limit the amount of herbicide that may be transported by watercraft.		To reduce likelihood of spills and contain any spills.	FSH 2109.14
H - Soils, Water and Aquatic Ecosystems			
H1	Follow herbicide-use buffers shown below. Tank mixtures would apply the largest buffer as indicated for any of the herbicides in the mixture.	To reduce likelihood that herbicides would enter surface waters in concentrations of concern and ensure that the project does not hamper attainment of riparian management objectives.	Herbicide-use buffers are based on label advisories; SERA risk assessments and Berg's 2004 study of broadcast drift and run off to streams. Herbicide-use buffers are intended to demonstrate compliance with R6 2005 ROD Standards 19 and 20.

PDF Reference	Design Features	Purpose of PDF	Source of PDF
H2	In riparian and aquatic settings, vehicles (including all-terrain vehicles) used to access invasive plant sites, or for broadcast spraying will not travel off roadways, trails and parking areas if damage to riparian vegetation, soil and water quality, and aquatic habitat is likely.	To protect riparian and aquatic habitats.	Common protection measure
H3	Avoid using picloram and/or metsulfuron methyl on bare or compact soils, and inherently poor productivity soils that are highly disturbed. Poor soils include shallow soils less than 20 inch depth that lack topsoil and serpentine soils.	To preserve site recovery after disturbance, lessen offsite runoff and leaching. Poor soils will have longer residence times with these persistent herbicides.	Label advisory
H4	Do not use more than one application of imazapyr, metsulfuron methyl, or picloram on a given area in any two calendar years, except to treat areas missed during the initial application. Aminopyralid would not be broadcast in any are more than once per year.	Reduce potential for accumulation in soil.	SERA Risk Assessments. Based on quantitative estimate of risk from a maximum level of exposure.
H5	Limit herbicide offsite transport on sites with high runoff potential including sites with: shallow seasonal water tables, saturated soils (wet muck and peat soils), steep erosive slopes with shallow soils and rock outcrop, or bare compacted and disturbed soils. Limit runoff by applying herbicide during the dry season with the lowest soil moisture conditions, where > 50% groundcover exists on shallow slope sites, and > 70% on steep slope sites, and/or at reduced rates.	Reduce potential offsite runoff transport of herbicides.	SERA Risk Assessments and Label. Based on quantitative risk for erosion and runoff.
H6	For soils with seasonally high water tables, do not use picloram or triclopyr BEE and limit glyphosate use to aquatic label only.	Reduce the risk for contamination of groundwater and offsite runoff to aquatic habitat and fish.	Label advisory
H7	Lakes and Ponds – No more than half the perimeter or 50 percent of the vegetative cover within established buffers or 10 contiguous acres around a lake or pond would be treated with herbicides in any 30-day period. This limits area treated within riparian areas to keep refugia habitat for reptiles and amphibians.	To reduce exposure to herbicides by providing some untreated areas for organisms to use.	SERA Risk Assessments. Based on quantitative estimate of risk from maximum herbicide exposure scenario and uncertainty regarding effects to reptiles and amphibians.

PDF Reference	Design Features	Purpose of PDF	Source of PDF
H8	Wetlands would be treated when soils are driest. If herbicide treatment is necessary when soils are wet, use aquatic labeled herbicides. Favor hand/selective treatment methods where effective and practical. No more than 10 contiguous acres or fifty percent individual wetland areas would be treated in any 30-day period.	To reduce exposure to herbicides by providing some untreated areas for some organisms to use.	SERA Risk Assessments. Based on quantitative estimate of risk from maximum herbicide exposure scenario and uncertainty in effects to some organisms, and label advisories.
H9	Herbicide use would not occur within 100 feet of wells or 200 feet of spring developments. For stock tanks located outside of riparian areas, use wicking, wiping or spot treatments within 100 feet of the watering source.	To reduce the potential for herbicide delivery to wells and springs that provide drinking water, and to protect watering systems used for grazing animals.	Label advisories and state drinking water regulations http://www.deq.state.or.us/wq/WhpGuide/ch2.htm.
H10	Use of Triclopyr BEE is only allowed in dry upland areas that are not hydrologically connected to water bodies.	Reduce the risk for contamination of groundwater and offsite runoff to aquatic habitat and fish.	Label and quantitative assessment for risk to aquatic organisms.
H11	Do not spray when local weather forecast calls for a ≥ 50% chance of rain, or when wind speed at the site is in excess of 8 mph.	Reduce potential offsite runoff transport of herbicides.	SERA Risk Assessments and Label. Based on quantitative risk for erosion and runoff.
I - Vascular and Non-Vascular Plant and Fungi Species of Concern			
I1	A USDA Forest Service botanist would use monitoring results/adaptive management to refine herbicide-use buffers in order to adequately protect botanical species on the Regional Forester's Sensitive List.	To prevent any repeated effects to sensitive botanical populations, thereby mitigating any long-term effects. Uncertainty about effects on nonvascular plants would be addressed through monitoring.	Herbicide-use buffer sizes for broadcast of most herbicides are based on Marrs 1989 based on tests on vascular plants. Spot and hand/select buffer distances are based on reports from experienced applicators.
I2	Botanical surveys will be conducted to document locations of sensitive plants if suitable habitat is within 100 feet of planned herbicide treatments	To ensure sensitive botanical species are protected and botanical surveys are conducted when appropriate	Forest Service Manual 2670 and applicable federally listed recovery plans
I3	Sensitive plants located within 100 feet of planned ground-based broadcast applications would be covered by protective barrier, or broadcast application would be avoided in these areas (spot or hand herbicide treatment, or non-herbicide methods may be used without covering sensitive plants)	To ensure sensitive botanical species are protected	Forest Service Manual 2670 and applicable federally listed recovery plans

PDF Reference	Design Features	Purpose of PDF	Source of PDF
I4	When sensitive plants are within 10 feet of saturated or wet soils at the time of herbicide application, only hand methods of herbicide application (wiping, stem injection,) would be used.	To ensure sensitive botanical species are protected	Forest Service Manual 2670 and applicable federally listed recovery plans
I6	Monitoring prework review would occur before implementation to ensure that prescriptions, contracts and agreements integrate appropriate project design features.	To ensure sensitive botanical species are protected	Forest Service Manual 2670 and applicable federally listed recovery plans
I7	Implementation monitoring would occur during implementation to ensure project design features are implemented as planned. An implementation monitoring form will be used to document daily field conditions, activities, accomplishments and/or difficulties. Contract administration mechanisms would be used to correct deficiencies. Herbicide use will be reported as required by the Forest Service Health Pesticide Use Handbook.	To ensure sensitive botanical species are protected	Forest Service Manual 2670 and applicable federally listed recovery plans
I8	Effectiveness monitoring would occur during and after treatment to determine whether invasive plants are being effectively controlled and to ensure non-target vegetation, especially sensitive species are adequately protected.	To ensure sensitive botanical species are protected	Forest Service Manual 2670 and applicable federally listed recovery plans
I9	The impacts of herbicide use on some sensitive botanical species are uncertain, especially non-vascular species. To manage this uncertainty, representative samples of herbicide treatment sites adjacent to sensitive botanical species would be monitored. Non-target vegetation within 100 feet of herbicide broadcast treatment sites and 20 feet of herbicide spot and hand treatment sites would be evaluated before treatment, immediately after treatment, and two to three months later as appropriate. Herbicide-use buffers would be expanded if damage is found as indicated by: •Decrease in the population of the species of conservation concern •Leaf discoloration or chlorophyll change •Mortality Monitoring would continue until three post-treatment visits (at one or more sites near each sensitive botanical species) confirm a lack of adverse effects.	To ensure SOLI are protected and survey are conducted when appropriate	Forest Service Manual 2670 and applicable federally listed recovery plans
J - Wildlife Species of Local Interest			
J1	**Gray Wolf**		

PDF Reference	Design Features	Purpose of PDF	Source of PDF
J1-a	Treatments within 1 mile of active wolf dens or rendezvous sites would only occur outside the season of occupancy (April 1 through June 30).	Reduce impacts to active dens or rendezvous sites	Federal Register (USDI FWS 2003)
J2	**Bald eagle**		
J2-a	Noise-producing activity above ambient levels would not occur near known winter roosts and concentrated foraging areas between October 31 and March 31 during the early morning or late afternoon. Disturbance to daytime winter foraging areas would be avoided.	Minimize disturbance and energy demands during the winter.	Bald Eagle Management Guidelines for OR-WA (Dillon 1981); USDI FWS 2007, No, 62 4(d)
J2-b	Treatment of areas within 0.25 mile, or 0.50 mile line-of-sight, of bald eagle nests would be timed to occur outside the nesting/fledging season of January 1 to August 31, unless treatment activity is within ambient levels of noise and human presence (as determined by a local specialist). Occupancy of nest sites (i.e. whether it is active or not) would be determined each year prior to treatments.	Reduce impacts to eagle nests and reproduction.	Bald Eagle Management Guidelines for OR-WA (Dillon 1981) and, USDA Forest Service 2005a
J3	**Peregrine Falcon**		
J3-a	Seasonal restrictions shall apply to all known peregrine falcon nest sites for the periods and elevations listed below: a. Low elevation sites (1000-2000 ft.) – Jan 1st to July 1st b. Medium elevation sites (2001-4000 ft.) – Jan 15th to July 31st c. Upper elevation sites (greater than 4000 ft.) – Feb 1st to Aug 15th These restrictions may be waived if the site is unoccupied or if nesting efforts fail and monitoring indicates no further nesting behavior. Seasonal restrictions shall be extended if monitoring indicates late season nesting, asynchronous hatching leading to late fledging, or recycle behavior which indicates that late nesting and fledging will occur. Protection would be provided until at least two weeks after all young have fledged.	Reduce disturbance to nesting birds and protect eggs and nestlings.	Pagel 2006 Peregrine falcon nest site data, 1983-2006.
J3-b	All invasive plant treatments would be restricted within 0.5 miles of peregrine falcon nests (primary nest zone) during the nesting season (described above).	Reduce disturbance to nesting birds and young.	Pagel 2006 Peregrine falcon nest site data, 1983-2006.

PDF Reference	Design Features	Purpose of PDF	Source of PDF
J3-c	Invasive plant treatments involving motorized equipment and/or vehicles would be seasonally prohibited within the secondary nest zone (0.5 miles to 1.5 miles of known nest sites) during the nesting season. This may include activities such as mulching, chainsaws, vehicles (with or without boom spray equipment) or other mechanically-based invasive plant treatment.	Reduce disturbance to nesting birds and young.	Pagel 2006 Peregrine falcon nest site data, 1983-2006.
J3-d	Non-mechanized or low disturbance invasive plant activities (such as spot spray, hand pull, etc.) may occur within the secondary nest zone (0.5 miles to 1.5 miles of known nests) during the nesting season, but would be coordinated with the wildlife biologist on a case-by-case basis to determine potential disturbance to nesting falcons and identify mitigating measures, if necessary.	Reduce disturbance to nesting birds and young.	Pagel 2006 Peregrine falcon nest site data, 1983-2006.
J3-e	Picloram and Clopyralid would not be used within 1.5 miles of a peregrine nest more than once per year.	Reduce herbicide exposure to eggs.	Pagel 2006 Peregrine falcon nest site data, 1983-2006.
J4	**Greater Sage Grouse**		
J4-a	Glyphosate use would be limited to the typical application rate.	Minimize exposure to herbicides and surfactants that could pose a risk.	Biological Evaluation for Malheur Invasive Plant EIS, USDA Forest Service 2000.
J4-b	Human activities within 0.3 mile of leks will be prohibited from the period of one hour before sunrise until four hours after sunrise and one hour before sunset until one hour after sunset from February 15 – May 15.	Minimize disturbance to breeding grouse	Connelly et al. 2000, USDI FWS 2003.
J4-c	Do not conduct any vegetation treatments or improvement projects in breeding habitats from February 15 – June 30.	Minimize disturbance to breeding grouse	Connelly et al 2000
J5	**Columbia Spotted Frog**		
J5-a	Avoid broadcast spraying of herbicides, or spot spraying of sulfometuron methyl within 100 feet of occupied or suitable spotted frog habitat. Follow herbicide-use buffers in wetlands. Treatment methods, timing and location will be coordinated with a local biologist prior to implementation.	Reduce impacts to the Columbia spotted frog.	Appendix P of the R6 2005 FEIS; SERA 2003, 2004; Bakke 2003
J6	**Silver bordered fritillary**		

PDF Reference	Design Features	Purpose of PDF	Source of PDF
J6-a	Within occupied sites, follow pdfs identified under vascular plants of concern to protect host/nectar plant species. Treatment type and timing would be coordinated with a biologist so that treatment can be modified if necessary to reduce potential effects.	Reduce the likelihood host/nectar plants would be affected.	Malheur Invasive Plant BE.
J6-b	Within occupied habitat proposed for treatment, use of ester formulations of herbicide would be prohibited.	Minimize exposure of herbicides and surfactants that could pose a risk to the silver bordered fritillary.	Malheur Invasive Plant BE.
J7	**Pygmy Rabbit**		
J7-a	Within suspected burrow areas, activities will be restricted to manual techniques. Treatment methods, timing and location will be coordinated with a local biologist.	Minimize chances a burrow would collapse.	Malheur Invasive Plant BE.
J8	**Upland Sandpiper**		
J8-a	In order to avoid disturbance or potential trampling of nesting upland sandpipers, no treatment would occur on sites that have historic or recent documentation of upland sandpipers during the nesting season (April 1st to August 1st), unless the site has been surveyed and no nesting is occurring.	Minimize likelihood that nests would be disturbed during treatment.	Malheur Invasive Plant BE.
J9	**Grasshopper Sparrow**		
J9-a	In order to avoid disturbance or potential trampling of nesting birds during the nesting season (May 1st to August 1st), no treatment would occur on sites where grasshopper sparrows have been documented.	Minimize likelihood that nests would be disturbed during treatment.	Malheur Invasive Plant BE.
J10	**Harney Basin Duskysnail**		
J10-a	If an occupied site is proposed for treatment, a local biologist would be consulted to determine protection measures, if necessary. These measures may include limitations on vehicle entry, modifications to treatment type or timing, or implementation of buffers.	Minimize likelihood that snails would be harmed from treatment	Malheur Invasive Plant BE
J11	**Featured Species: Raptors and Osprey**		
J11-a	Active raptor nest sites will be protected during implementation. If a raptor nest is found within 0.50 mile of a site proposed for treatment, a wildlife biologist will be consulted to determine appropriate seasonal restriction dates and buffer distances, if necessary.	Reduce impacts to raptor nesting and reproduction.	Malheur and Ochoco LRMP
J12	**Big game**		

PDF Reference	Design Features	Purpose of PDF	Source of PDF
J12-a	Restrict off-highway vehicle use within MA 41 (big game winter range) between December 1 and April 1.	Reduce disturbance to wintering elk and deer.	Malheur LRMP
J12-b	To prevent harassment in designated calving areas, restrict off-highway vehicles and other motorized traffic use to designated roads and trails from May 1 to June 31.	Reduce impacts during elk calving.	Malheur LRMP
J-13	**Yellow-billed Cuckoo**		
J13-a	If a known breeding site is proposed for treatment a biologist will be contacted to determine protection measures. These measures may include limitations on vehicle entry, modifications to treatment type or timing, or implementation of buffers. Protection measures would be coordinated with the USFWS.	Minimize likelihood that nests would be affected by treatment	Malheur Invasive Plant BE
K	**Public Notification**		
K1	High use areas, including administrative sites, developed campgrounds, visitor centers, and trailheads would be posted in advance of herbicide application or closed. Postings would indicate the date of treatments, the herbicide used, and when the areas are expected to be clear of herbicide residue. See also L2 for special products and M1 for cultural plants.	To ensure that no inadvertent public contact with herbicide occurs.	These are common measures to reduce conflicts.
K2	The public would be notified about upcoming herbicide treatments via the local newspaper or individual notification, fliers, and posting signs. Forest Service and other websites may also be used for public notification.	To ensure applicators know what area has been treated and to ensure no inadvertent public contact with herbicide occurs.	R6 2005 ROD Standard 23 (see table 1).
L	**Special Forest Products**		
L2	Members of the public who identify specific forest product collection areas, non-target edible or medicinal species they collect, or areas of cultural or spiritual value, will be informed about upcoming use of herbicide in the area. Specific edible or medicinal plant collection areas identified by the public would be prominently posted prior to spraying.	To minimize potential for public exposure to herbicides and acknowledge the public's need to know whether herbicide may be used in specific areas where they harvest medicinal or edible plants.	R6 2005 ROD Standard 23
L4	Flyers indicating upcoming herbicide treatments and explaining the use of blue dye may be included with mushroom and special forest product collection permits, in multi-lingual formats if necessary. See section K.	To minimize potential for public exposure to herbicides	R6 2005 ROD Standard 23
M	**American Indian Tribal and Treaty Rights and Archaeology**		

PDF Reference	Design Features	Purpose of PDF	Source of PDF
M1	American Indian tribes would be notified annually as treatments are scheduled so that tribal members may provide input and/or be notified prior to gathering cultural plants. Cultural plants identified by tribes would be buffered as above for botanical species of concern; (see section I2, I3, and I4).	To ensure that no inadvertent public contact with herbicide occurs and that cultural plants are fully protected.	Government to government agreements between American Indian tribes and the Malheur National Forest.
N	**Range Resources**		
N2	Permittees will be notified of annual treatment actions at the annual permittee operating plan meeting, and/or notified within 2 weeks of planned treatments of infestations > 1 acre in size.	To ensure permittee has knowledge of activities occurring within the allotment	Common Practice
N3	Follow most current EPA herbicide label for grazing restrictions.	To ensure grazing animals are not exposed to chemicals	EPA labeling requirements

Herbicide Use Buffers

Herbicide treatments would become more restrictive as they occur close to water. Project design features and herbicide use buffers within the aquatic influence zone were developed based on label advisories; SERA risk assessments, and various studies of drift and runoff to streams such as Berg 2004. In general, aquatic labeled herbicides and aminopyralid may be used to the water's edge, with potential additional restrictions, depending on soils or other factors such as herbicide effectiveness on the target species and sensitivity and susceptibility of non-target species. Herbicide use buffers for streams, wetlands, lakes, ponds and surface water are summarized in tables 4 and 5.

Table 4: Herbicide use buffers for streams, wetlands, lakes and ponds with water present at the time of treatment.

Herbicide	Streams, wetlands, lakes and ponds and hydrologically connected roadside ditches with surface water present	
	Broadcast	Spot/Hand/Select
Aquatic Glyphosate	60	Water's edge
Aquatic Imazapyr	60	Water's edge
Aquatic Triclopyr-TEA	Not Allowed	15
Aminopyralid	**Water's edge**	**Water's edge**
Clopyralid	100	15
Imazapic	100	15
Metsulfuron Methyl	**100**	**15**
Imazapyr	100	50
Sulfometuron Methyl	100	50
Chlorsulfuron	**100**	**50**
Picloram	100	50
Sethoxydim	100	50

Herbicide	**Streams, wetlands, lakes and ponds and hydrologically connected roadside ditches with surface water present**	
	Broadcast	**Spot/Hand/Select**
Glyphosate	100	50

Table 5: Herbicide use buffers for stream channels that are dry at the time of treatment.

Herbicide	**Intermittent and Ephemeral Streams (Dry at time of treatment)**	
	Broadcast	**Spot/Hand/Select**
Aquatic Glyphosate	Bankfull	No buffer
Aquatic Imazapyr	Bankfull	No buffer
Aquatic Triclopyr-TEA	Not Allowed	Bankfull
Aminopyralid	**No Buffer**	**No Buffer**
Imazapic	50	Bankfull
Metsulfuron Methyl	**50**	**Bankfull**
Clopyralid	50	Bankfull
Imazapyr	50	15
Sulfometuron Methyl	50	15
Chlorsulfuron	**50**	**15**
Picloram	100	50
Sethoxydim	100	50
Glyphosate	100	50
Triclopyr-BEE	Not Allowed	150

Early Detection Rapid Response (EDRR)

Alternative B provides for treatment flexibility and early detection and rapid response by providing a method for us to adapt to changes on the ground over time. We expect some populations to increase and others to decrease over the life of this project, depending on many unpredictable factors such as weather (droughts and wet periods), funding, and the location of wildland fires or other uncontrolled disturbances. Under Alternative B we will tailor the prescription to ground conditions at the time of treatment.

In addition, new or previously undiscovered infestations could be treated using the range of methods described in this EIS. An EDRR approach is needed because (1) the precise location of individual target plants, including those mapped in the current inventory, are subject to rapid and/or unpredictable change, and (2) the typical NEPA process does not allow for rapid response to new detections; infestations may grow and spread into new areas during the time it usually takes to prepare NEPA documentation. The intent of the project early detection and rapid response approach is to treat new infestations when they are small so that the likelihood of successful treatment is maximized and adverse effects are minimized.

Under alternative B integrated treatments would be authorized for new infestations detected over the next 5 to 15 years, using the treatment methods and project design features evaluated in this EIS. The analysis of Alternative B assumes that all of the current infestations are treated in a single year and all pdfs are properly applied.

Compared to Alternative A, herbicide use would increase as a result of implementing this alternative; however, we would also reduce reliance on herbicides over time as target invasive plant populations are reduced and desirable vegetation is restored. Newly detected invasive plants are high priority for treatment and herbicides may be used, however we do not expect EDRR to require extensive herbicide treatments. Our intention is to rapidly respond to new detections and treat them while they are small, increasing our chances of success and minimizing the amount of herbicide needed.

The approach is based on the premise that the impacts of similar treatments are predictable, even though the precise location or timing of the treatment may be unpredictable. The project early detection/rapid response approach would allow the Forest Service to treat new infestations using approved methods anywhere on the MNF that the need exists. The Implementation Planning process detailed in the following section is intended to ensure that pdfs and herbicide use buffers are appropriately applied and that effects are within the scope of those disclosed in this EIS. FSH 1909.15, Chapter 18.1, provides guidance of review of ongoing projects to determine if the environmental analysis and documentation should be corrected, supplemented, or revised.

Treatment Caps

Treatment caps provide further sideboards to minimize adverse effects and ensure that the effects of treatments authorized under the project EIS are consistent with the analysis disclosed. The following are treatment caps alternative B:

1. In no case would more than 2,124 discrete acres be treated using herbicides in a single year (based on our existing, site-specific inventory).
2. No more than 30,000 acres (including initial and repeat treatments) would be treated using any method over the life of the project.
3. No more than 10 percent of the total acres of any 6th field sub-watershed would be treated in a single year. No more than 50 acres within 100 feet of any water body in a 6th field watershed would be treated in a single year, and of these, no more than 10 acres would consist of herbicide use.

Alternative A (No Action)

Under No action there would be no invasive plant treatments would be authorized. The MNF invasive plant treatment program would not follow current invasive plant management direction.

Since 2002, when use of biological agents and chemicals for invasive plant control was enjoined by the court on the Malheur National Forest, most treatments have been manual (primarily hand pulling and digging) with limited mechanical treatment (primarily mowing).

In 2010, the Malheur National Forest treated about 375 acres with manual and mechanical treatments using “Forest Service personnel, County cooperators, and Nature Conservancy volunteers” (R6 2010 accomplishment report). In 2011, the Malheur National Forest treated 203 acres in essentially the same manner (R6 2011 accomplishment report). The year 2012 saw a drop in manual and mechanical acres accomplished to 39 (R6 2012 accomplishment report). Partners and cooperators in 2012 were the Confederated Tribes of the Warm Springs, Harney County, the Nature Conservancy, Oregon Department of Agriculture, and Oregon Department of Transportation.

If Alternative A, no action is selected, the Forest Service would not treat invasive plants as proposed in the action alternatives. Invasive plant treatments would likely continue on state road right of ways and easements within the Malheur National Forest because they are not subject to Forest Service control. Any future treatments would require a separate environmental analysis. For example categorical exclusions may be completed to authorize manual and limited mechanical treatments in site specific areas. Prevention measures applied during land uses would continue to slow (but not stop) the spread of invasive plants on the MNF and surrounding lands.

No biological agents were deliberately released within MNF boundaries because the 2002 Court Order enjoined the Forest Service from releasing these agents. However, biological agents that have been released in surrounding National Forests and other ownerships and disperse to new areas on their own. The analyses of the environmental effects of biological control agents have already been completed under documents developed by Agricultural Plant Health and Insect Service (APHIS) for approval of their use. The completed environmental impact statements are available at: http://www.aphis.usda.gov/plant_health/ea/index.shtml. These analyses assume the agent may occur throughout the range of its host invasive species.

Alternative C (Limitations on Herbicide Use)

We developed Alternative C in response to some public concerns about herbicide use on the MNF. Alternative C would impose strict limitations on our ability to use herbicides to treat invasive plants. Compared to Alternative B, Alternative C would address public concerns about herbicide impacts to human health; non-target vegetation and pollinators; potential water contamination and herbicide effects on fish; and wildlife, while still allowing for some herbicide use. About 735 acres would be approved for spot/selective herbicide use and on the remaining 1,389 acres, no herbicide would be used. The following summarizes alternative C:

- Alternative C would include all of the integrated treatment methods listed for Alternative B except broadcast treatment would not be authorized and no picloram would be used. Biological controls that meet Standard 14 would be released as described under alternative B. Of the herbicides considered for use, the first choice herbicides are most likely to be used. The herbicides sethoxydim, sulfometuron methyl and triclopyr are the least likely to be used, either because they are effective on fewer target species found on the Forest than other herbicides or because of the restrictions associated with their use.

- Under Alternative C, all of the Project Design Features for Alternative B would be followed, except that pdfs related to broadcast spraying, use of picloram and herbicide use within 100 feet of streams or other water bodies would become non-applicable.

- No herbicide use would be allowed within the boundaries of any mapped infested area that at any point is within 100 feet of creeks, lakes, ponds and wetlands; or 200 feet of well source areas. Non-herbicide methods would continue to be used within of these areas. The buffer tables associated with Alternative B would become non-applicable since no herbicide use would be allowed within 100 feet of streams. No herbicide use would be authorized within 100 feet of hydrologically connected roadside ditches when surface water is present.

- Restoration would be the same as alternative B.

- Alternative C would provide for treatment flexibility through the life of the project. Newly detected infestations could be treated according to the pdfs associated with this alternative. No broadcast treatments, use of herbicides within 100 feet of streams, or use of picloram would be authorized for future year treatments. Selective and spot treatment of herbicide would be limited to no more than 735 acres per year, or total 11,025 acres over the life of the project.[2] The total of non-herbicide and herbicide methods would not exceed 30,000 acres over a 15 year period.

- These restrictions would apply to known sites as they change over time, as well as new detections. The implementation planning process would be similar to Alternative B, however the range of treatments that would be allowed and the places, types and amounts of herbicide that may be used would be more restrictive.

Alternative D (No Aminopyralid)

The regional invasive plant EIS (USDA FS 2005a) approved 10 herbicides for use including all those listed in table 2, with the exception of aminopyralid. Some members of the public have expressed doubt about whether or not this herbicide should be approved, primarily because it is new and effectively kills broadleaf plants. As a result alternative D was developed to evaluate tradeoffs involved with adding aminopyralid to the list of available herbicides in the Region.

Alternative D would be similar to alternative B, except aminopyralid would not be approved for use on the MNF. As described previously, aminopyralid is the preferred herbicide for approximately 64 percent of the existing invasive plant infestations. Because it would be eliminated as a “management tool” under this alternative, more picloram, metsulfuron methyl, chlorsulfuron and glyphosate would be used under this alternative. In some cases, the first choice herbicide would not be approved for use near streams (e.g. picloram) and another herbicide (e.g. glyphosate) would become the first choice.

The herbicide use rates, pdfs and herbicide use buffers associated with aminopyralid would become non-applicable. Much of the infested sites near streams and other water bodies would be spot treated rather than broadcast as directed by the herbicide use buffers associated with herbicides other than aminopyralid. Of the eleven herbicides considered for use, the first choice herbicides are most likely to be used. The herbicides sethoxydim, sulfometuron methyl and triclopyr are the least likely to be used.

Methodology

The analysis of the wildlife resource presented here was done using a multi-scale assessment that evaluated habitat conditions and potential effects to wildlife. Wildlife evaluated in this assessment includes 1) an evaluation of Management Indicator Species (MIS) (FSM 2620.1, 2621.4, 2620.3), which assesses the habitat and effects to wildlife species associated with vegetation communities or key habitat components identified in the Forest Plan (USDA-FS 1989, USDA-FS 1990a), 2) an assessment of Federally Threatened and Endangered Species and Regionally Sensitive species (TES) (FSM 2670.32, 16 USC 1536), which evaluates effects to species considered most at risk, 3) an assessment of featured species emphasized in the Forest Plan (IV-31) or Plan amendments (USDA-FS 1995 p. 10), 4) an assessment of priority/unique habitats and associated species identified in the Partner In Flight (PIF) landbird conservation plans (Altman 2000a, Altman and Holmes 2000) and 5) an assessment of birds of conservation concern, including those identified by the U.S. Fish and Wildlife Service (FWS) (USDI FWS 2008). These species are collectively referred to as Species of Conservation Concern.

As described above, the project area includes the entire Malheur National Forest. As a result, species evaluated in this document include MIS and featured species identified in both the Malheur (USDA-FS 1990a) and Ochoco (USDA-FS 1989) Forest Plans, federally listed species and species identified as sensitive by the Regional Forester (USDA-FS 2011a).

The appropriate methodology and level of analysis needed to determine effects are influenced by a number of variables including the presence of species or habitat, the scope and nature of activities associated with the proposed action and alternatives and the potential risks that could ultimately result in adverse effects. Wildlife distribution and use of an area is often determined by the availability of suitable habitat and can be influenced by site specific needs such as the vegetative structure or physical features on a site, as well as by landscape considerations such as the proximity to other habitat or the need for isolation or seclusion. As a result a multi-scale analysis that considers site specific conditions in stands proposed for treatment (fine filter), as well as landscape considerations such as the proximity and availability of suitable habitat (coarse filter) will be considered.

In addition to the regulatory framework, the best available science is considered in preparation of this report. However, what constitutes best available science might vary over time and across scientific disciplines. As a general matter, consideration was shown of the best available science when the scientific integrity is insured in the discussions and analyses in the project NEPA document. This report identifies methods used; references scientific sources relied on, and disclose incomplete or unavailable information, scientific uncertainty, and risk.

Herbicide Treatment Analysis

During public scoping on the proposed action, comments were received indicating concern about the effects of herbicides to "terrestrial wildlife species and birds" and threatened and endangered species. The herbicides that are proposed for use to control invasive plants have potential to affect wildlife through normal use, or accidental spillage. In this analysis, data from risk assessments were used to determine if groups of wildlife species could be exposed to harmful doses of herbicides. This was evaluated against potential exposure scenarios for plausibility, and the results were focused on comparing the effects of the alternatives on those groups of animals.

Existing Data and Methodology

In order to register herbicides for outdoor use, the EPA requires the manufacturers to conduct a safety evaluation on wildlife including toxicity testing on representative species of birds, mammals, freshwater fish, aquatic invertebrates, and terrestrial and aquatic plants. The hazards associated with each herbicide active and inert ingredients, impurity or metabolites were determined by a thorough review of available toxicological studies and were included in the Forest Service risk assessments. This information is provided in Appendix P of the R6 2005 Invasive Plant FEIS (USDA Forest Service, 2005a), and subsequent SERA risk assessments (SERA 2007) which are incorporated by reference.

The Forest Service contracts with Syracuse Environmental Research Associates, Inc. (SERA) to conduct ecological risk assessments for herbicides proposed for use on NFS lands. The information contained in this document relies on these risk assessments and interpretations from the R6 2005 FEIS.

To determine potential effects, representative species groups of wildlife, and data from existing laboratory and field studies were used to discover which groups of species might be at the greatest risk from herbicide use. The general categories analyzed, and exposure scenarios developed, depended upon available toxicity data and species of concern in Oregon.

An exposure scenario was developed, when enough data was available, and a quantitative estimate of dose received by the animal type in the scenario was calculated (SERA, 2007). The scenarios used to calculate doses include direct spray of small mammals, birds and mammals eating vegetation or insects sprayed with herbicide, predatory mammals and birds eating small mammals or fish, and small mammals drinking contaminated water. The risk assessments prepared by SERA (2001a, b; 2003a-d; 2004a-f; 2007; 2011a-d) contain detailed analysis of the potential effects of each herbicide. Portions of risk assessments pertaining to wildlife are summarized in Appendix P of the R6 2005 FEIS.

The quantitative estimates of dose were compared to available toxicity data to determine potential adverse impacts. For this analysis, the most sensitive response (i.e. a sub-lethal effect that occurred at the lowest dose) from the most sensitive species was used to determine “toxicity indices” for each herbicide. When a calculated dose was greater than the toxicity index, the analysis stated that there was a potential for adverse effects. This approach assumes maximum potential effects of herbicides even though the pdfs and herbicide use buffers would minimize potential exposure for herbicides that pose a risk.

The toxicity index acts as a threshold; doses below the index would result in no known (or discountable) effect and doses substantially above a threshold would be considered to possibly pose some risk. The level of risk depends on how far above the threshold a particular dose is estimated to be. Due to the nature of the toxicity data, doses only slightly above the toxicity index would still be considered to pose no likely risk (Hazard Quotients of 2-10).

In order to analyze potential effects from proposed invasive plant treatments on the project area, each species of conservation concern was assigned to an exposure scenario category (e.g. small insectivorous bird, large herbivorous mammal, etc.). Results of risk assessments for each herbicide were then applied to each species within the exposure scenario category to evaluate risk of each herbicide or surfactant.

Professional judgment was used to evaluate the life history traits (e.g. diet, habitat, activity patterns, seasonal occurrence, etc.) of each wildlife species evaluated to determine the likelihood of exposure to herbicides or surfactant used to treat invasive plants. The combinations of likelihood of exposure, dose estimated from exposure scenarios, and GIS wildlife location data for the MNF was used to determine the risk of effect from herbicide treatments.

Effects of treatment, including herbicide and non-herbicide activities were evaluated using professional judgment and knowledge related to the life history of the species evaluated, local knowledge and documentation of Forest-wide wildlife, available research and literature on treatments and species ecology, and information provided in the R6 2005 Invasive Weed EIS.

Data Limitations

The data for amphibians is much more limited than that available for mammals and birds and for most herbicides, available data is not sufficient to conduct quantitative estimates of exposure and toxicity data for amphibians. The Forest Service/SERA Risk Assessments use information from the literature, when available, and the calculated concentrations of herbicide in water from runoff or accidental spill to determine risk to amphibians. When data on amphibians were not available, fish were used as surrogate species. Data suggest that amphibians may be as sensitive to herbicides as fish (Berrill et al. 1994; Berrill et al. 1997; Perkins et al. 2000). For the purposes of this analysis, herbicides that pose potential risk to fish (as determined by the quantitative estimates from exposure scenarios) were also considered to pose a risk to amphibians.

Data is limited regarding the potential effects of herbicides on mollusks. Only glyphosate and picloram have been tested on a terrestrial mollusk; the brown garden snail (*Helix aspersa*). Neither glyphosate nor picloram appeared to pose a risk to the snail (USDA FS 2005e). Relyea (2005b) found no effect to three species of aquatic snails from the glyphosate formulation Roundup.

Insufficient data is available in many cases to allow for a quantitative risk assessment. For instance, there is no quantitative scenario for a predatory bird that eats primarily other birds, such as the peregrine falcon, so the “fish-eating bird” scenario was used as a surrogate. This scenario likely overestimates the dose to the peregrine falcon because the hypothetical fish consumed are from a pond contaminated by a large spill of herbicide. These hypothetical fish likely have higher concentrations of herbicide in their bodies (and thus a higher dose to the predatory bird) than would a small bird that incidentally ingested herbicide before it was preyed upon. Data was insufficient to assess risk of chronic exposures for insect-eating birds and mammals for several herbicides.

Direct spray of small mammals and consumption of small mammals that have been directly sprayed by predatory birds or mammals exceed the toxicity indices for a few herbicides. However, these scenarios, while possible, were determined to not be plausible. Many small mammals are nocturnal and spend daylight hours in burrows or trees, or seek cover if disturbed, reducing the likelihood that they would be directly sprayed. In the case of predatory birds or mammals, the predator would have to consume an entire day’s diet worth of directly sprayed small mammals to receive the dose that exceeded the toxicity index.

Research has not been conducted on the effect of proposed herbicides to most free-ranging wildlife, so the relevant data to specifically evaluate effects to different wildlife species is incomplete or unavailable. Specific relevant data that is lacking includes:

- For several herbicide/species group combinations, both NOAEL and LOAEL values have not been determined.
- There is insufficient data to assess risk of chronic exposures for a large grass-eating bird or small insect-eating birds and mammals.
- The toxicity of the herbicides to amphibians, reptiles, terrestrial invertebrates, birds and other animals found in Region 6 is either unknown or limited, and cannot be fully characterized with the available data on surrogate species.
- Analysis of effects for any project involving herbicide use relies on extrapolations from laboratory animals to free-ranging wildlife and controlled conditions to the natural environment.
- There is less data available for birds than mammals, so mammal toxicity values must be used in bird exposure scenarios for some of the herbicides considered.

Limitations notwithstanding, a substantial amount of scientific data on the toxicity of proposed herbicides to birds and mammals, and some amphibians and invertebrates exist. The data is generated by manufactures to meet EPA regulations before an herbicide may be registered for use, and by independent researchers that have published findings in peer-reviewed literature. So while some data is lacking, adequate information exists to assess potential impacts of the herbicides proposed on wildlife

Non-herbicide Treatment Analysis

The effects of non-herbicide treatments to wildlife were evaluated by consulting peer-reviewed literature, Appendix J of the Regional FEIS (USDA FS 2005a), as well as using professional judgment and common sense.

Affected Environment

Invasive Plants and Wildlife

Invasive plants are thought to generally degrade wildlife habitat, especially for species that require intact native plant ecosystems. Some wildlife species use invasive plants for food or cover. For example, American goldfinch (*Carduelis tristis*), and red-winged blackbird (*Agelaius phoeniceus*) use purple loosestrife for nesting (Kiviat 1996; and Thompson 1987), and native bighorn sheep will eat cheatgrass (Csuti et al. 2001). It has been reported that elk, deer, and rodents eat rosettes and seed heads of spotted knapweed. Doves, hummingbirds, honeybees, and the endangered southwestern willow flycatcher (*Empidonax trailii extimus*) are known to use saltcedar (Barrows 1996).

The few uses that an invasive plant may provide do not outweigh the adverse impacts to an entire ecosystem (Zavaleta 2000). Invasive plants have adversely impacted habitat for native wildlife in Oregon (ODFW 2006). Species of wildlife that depend upon native vegetation for food, shelter, or breeding can be adversely affected by invasive plants. Species restricted to very specific habitats, for example pond-dwelling amphibians, are more susceptible to adverse effects.

Displacement of native plant communities by non-native plants results in alterations to the structure and function of ecosystems and constitutes a principle mechanism for loss of biodiversity at regional and global scales (Lacey and Olson 1991). Mills et al. (1989) and Germaine et al. (1998) found that native bird species diversity and density were positively correlated with the volume of native vegetation, but were negatively correlated or uncorrelated with the volume of exotic vegetation.

Invasive plants can adversely affect wildlife species by eliminating required habitat components, including surface water (Dudley 2000; Horton 1977), reducing available forage quantity or quality (Bedunah and Carpenter 1989; Rice et al. 1997; Trammell and Butler 1995); reducing preferred cover (Rawinski and Malecki 1984; Thompson et al., 1987); drastically altering habitat composition due to altered fire cycles (D'Antonio and Vitousek 1992; Mack 1981; Randall 1996; Whisenant 1990); and physical injury, such as that caused by long spines or "foxtails" (Archer 2001). In the case of common burdock (*Arctium minus*), the prickly burs can trap bats and hummingbirds and cause direct mortality to individuals (Raloff 1998). Invasive plants that grow large and densely (e.g., giant reed, Himalayan blackberry) can act as physical barriers to water sources and essential habitat.

Invasive plants can act as a population sink by attracting a species and then exposing it to increased mortality or failed reproduction (Chew 1981). Schmidt and Whelan (1999) reported that native birds increased their use of exotic Lonicera and Rhamnus shrubs over native trees, even though nests built in the exotic shrubs experienced significantly higher mortality rates.

Some invasive plants (such as knapweed) contain chemical compounds that make the plant unpalatable to grazing animals. Chemical compounds in these invasive plants disrupt microbial activity in the rumen, or cause discomfort after being ingested, resulting in a reduced or avoided consumption of the invasive plant (Olson 1999).

Habitats that become dominated by invasive plants are often not used, or are used much less, by native and rare wildlife species and species such as yellow starthistle and knapweed reduce wildlife habitat (USDA FS 2007, Utah State University 2013), and can degrade upland game bird habitat. Some hunters and wildlife managers are concerned that invasive plants are degrading the quality of remaining habitat for deer and elk, adversely affecting distribution of the animals and hunting opportunities. Trammell and Butler (1995) found that deer, elk, and bison avoided sites infested with leafy spurge (*Euphorbia esula*). Tamarisk stands have fewer and less diverse populations of wildlife (Jakle and Gatz 1985; Olson 1999). Invasion by purple loosestrife makes habitat unsuitable for numerous birds, reptiles, and mammals (Kiviat 1996; Lor 2000; Rawinski and Malecki 1984; and Thompson et al. 1987; Weihe and Neely, 1997; Weiher et al. 1996). Reed canary grass, implicated in the loss of Oregon spotted frog habitat, may have contributed to contractions in the range of Oregon spotted frogs in western Oregon (Hayes 1997; McAllister and Leonard 1997). Bald eagle mortality in other parts of the U.S. has been linked to a toxin produced by cyanobacteria that grow on the invasive aquatic plant, *Hydrilla verticillata* (Wilde 2005).

In summary, invasive plants are known or suspected of causing the following effects:

- Embedded seeds in animal body parts (e.g. foxtails), or entrapment (e.g. common burdock) leading to injury or death.
- Scratches leading to infection.
- Alteration of habitat structure leading to habitat loss or increased chance of predation (Schmidt and Whelan 1999).
- Change to effective population size through nutritional deficiencies or direct physical mortality.
- Poisoning due to direct or indirect ingestion of toxic compounds found on or in invasive plants.
- Altered food web and nutrient cycling (Allison and Vitousek 2004).
- Source-sink population demography, with more demographic sinks than sources.
- Lack of proper forage quantity or nutritional value at critical life periods.

Terrestrial Wildlife Species of Conservation Concern

Federally Listed Species

The following section discusses species that have been, are currently, are proposed for or are candidates for listing under the federal Endangered Species Act. Threatened and endangered species evaluated include the Canada lynx (threatened), North American wolverine (proposed for listing) and yellow-billed cuckoo (proposed for listing). Three species, including the bald eagle, peregrine falcon, and gray wolf (Rocky Mountain Distinct Population Segment (DPS)) have been delisted (USFWS 2007a, USFWS 20011a) and are currently managed as Region 6 sensitive species. The gray wolf outside the Rocky Mountain DPS, which is federally endangered, does not occur within the project area and will not be evaluated in detail in this analysis. The project area is within the range of and provides habitat for the Columbia spotted frog and greater sage grouse. Because they have not been formally listed, these two species are analyzed as Forest Service sensitive species.

Table 6: Threatened, Endangered Proposed and Candidate Species

Common Name	Scientific Name	Conservation Status	Species Presence
Canada Lynx	*Lynx canadensis*	Threatened	Not Present
North American Wolverine	*Gulo gulo luscus*	Proposed Threatened	Suspected
Yellow-billed Cuckoo	*Coccyzus americanus*	Proposed Threatened	Suspected
Gray Wolf[1] (Rocky Mountain DPS)	*Canis lupus*	Delisted-Sensitive	Suspected
Gray Wolf outside Rocky Mountain DPS	*Canis lupus*	Endangered	Not Present
Bald Eagle[1]	*Haliaeetus leucocephalus*	Delisted-Sensitive	Documented
American Peregrine Falcon[1]	*Falco peregrinus anatum*	Delisted-Sensitive	Documented
Greater Sage Grouse[1]	*Centrocercus urophasianus*	Candidate-Sensitive	Documented
Columbia spotted frog[1]	*Rana luteiventris*	Candidate-Sensitive	Documented

[1]Evaluated as a Region 6 sensitive species (USDA FS 2011).

The following is a brief description of the species', life history, threats and generally recognized species protection measures. The species status and available habitat on the project area and the amount of habitat currently affected by known invasive plant sites. Additional information on T and E species can also be found in the Biological Assessment prepared for the Regional Invasive Plant Program (USDA Forest Service 2005a), which is incorporated by reference into this analysis.

Canada lynx

Status, Life History and Habitat Description

The population, distribution, life history, habitat status and recovery objectives for Canada lynx are detailed in Ruggiero et al. (1999), Ruediger et al. (2000), USDI Fish and Wildlife Service (2006a) and USDI Fish and Wildlife Service (2007c). The following is a summary of lynx habitat preferences and biology.

Lynx are highly specialized predators of snowshoe hare (*Lepus americanus*) and habitat can generally be described as moist boreal forests that have cold, snowy winters and a snowshoe hare prey base (USDI Fish and Wildlife Service 2006a). Lynx habitat generally consists of lodgepole pine, subalpine fir, and Engelmann spruce, whereas dry forest types (e.g. ponderosa pine and climax lodgepole pine) generally do not provide suitable habitat (Ruediger et al. 2000).

Snow conditions also determine the distribution of lynx (Ruggiero et al. 1999) as lynx are adapted for hunting snowshoe hares and surviving in areas that have cold winters and deep, fluffy snow for extended periods. Because of the patchiness and temporal nature of high quality snowshoe hare habitat, lynx populations require large boreal forest landscapes to ensure that sufficient high-quality snowshoe hare habitat is available at any point in time so that lynx may move freely among patches of suitable habitat and among subpopulations of lynx (USDI Fish and Wildlife Service 2009a).

Lynx are highly mobile and long-distance movements (greater than 60 miles) are characteristic (Aubry et al. 2000 in Ruggiero et al. 1999). Lynx disperse primarily when snowshoe hare populations decline. Sub-adults also disperse when prey is abundant and lynx make exploratory movements outside their home range (USDI Fish and Wildlife Service 2009a).

Lynx den sites are located where coarse woody debris, such as downed logs and windfalls and den habitat may be located in older regenerating stands or in mature forest where downed woody debris is available (USDI Fish and Wildlife Service 2007c). Lynx productivity is highly dependent on the quantity and quality of winter snowshoe hare habitat which is a limiting factor for lynx persistence.

Threats

Risk factors for lynx include direct human threat (shooting, trapping, vehicle collisions), as well as changes in forage and denning habitat. Lynx have evolved a competitive advantage in deep snow environments due to their large paws that allow them to hunt prey where other predators cannot because of snow conditions. There is a concern that compacted snow routes allow these other predator's access into isolated areas that are normally used exclusively by lynx (Wisdom et al. 2000). This increased access can also increase lynx vulnerability to harvest, collision, or harassment. These concerns have not been conclusively verified however. Fire suppression and logging have altered the mosaic of habitats needed for prey species and denning sites (Wisdom et al. 2000). Invasive plants have not been identified as a threat to lynx.

Project Area Status

The Blue Mountains represent the southern extent of lynx distribution, which would explain the rarity of this species on the periphery of its range both historically and now (USDI FWS 2005). Lynx habitat in northeast Oregon is categorized as "peripheral area;" four relatively recent specimens are known, one from Wallowa County in 1964, Benton County in 1974, Harney County in 1993 (McKelvey et al. 2000), and near Burns in 1994. Self-maintaining populations of lynx in Oregon have not existed historically (Verts and Carraway 1998). Based on limited verified records, lack of evidence of reproduction and occurrences in atypical habitat that correspond with cyclic highs, lynx have never maintained resident populations, although they are considered an infrequent and casual visitor by the state of Oregon (Ruediger et al. 2000, pp. 4-7).

Winter track surveys for lynx and wolverine were conducted by the MNF from 1991-1994 and no confirmed lynx tracks were found. Hair snares were used to survey for lynx, according to the National Lynx Survey, during the summers of 1999-2001. There were no lynx detections confirmed from this survey effort. It is unknown whether lynx are currently present on the MNF, but there are no verified records and there is no evidence of occupation or reproduction that would indicate colonization or sustained use by lynx.

Occupied lynx habitat includes lands that either have had at least two verified lynx observations or records since 1999 or places where there is evidence of lynx reproduction on the national forest (USDI FWS 2006a). Because neither of these conditions exists, the project area is considered unoccupied lynx habitat.

Lynx habitat within the project area was mapped using the vegetation and environmental conditions for the Northern Rocky Mountains Geographic area, and more specifically, the Blue Mountain Section, including NE Oregon and west-central Idaho. Primary vegetation was based on the direction provided in the Canada Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000), and follow-up guidance from the Forest Service Regional Office and the Lynx Biology Team. Sixth code Hydrologic Unit Codes (HUC), were used as the basis for delineating lynx habitat across the MNF. Although the Lynx Conservation Agreement (May 2006a), states that the LCAS does not apply to forests that are considered as having unoccupied habitat, the LAU acreage was used to identify potential lynx habitat on the MNF. Suitable lynx habitat occurs in the Strawberry, Glacier and Indian Rocks Lynx Analysis Units (LAU).

Table 7 identifies the total amount and type of suitable lynx habitat within project area LAU's, as defined in the LCAS, as well as known invasive plant infestations within suitable habitat.

Currently, 16 acres of suitable lynx habitat are affected by invasive plants. Roads serve as one of the primary vectors for the spread of invasive plants. +3

.5Because lynx prefer remote habitat within forested areas, there has only been a few acres of invasive weeds within suitable habitat identified.

Table 7: Acres of Lynx habitat in the Project Area

Habitat	Denning (ac)	Foraging (ac)	Total (ac)
Suitable Lynx Habitat	26,849	14,158	41,007
Habitat Affected by Invasive Plants	8	8	16

Wolverine

Status Life History and Habitat Description

The wolverine is now a proposed threatened species, per findings of the USDI Fish and Wildlife Service, 50 CFR Part 17, 78 FR 7864, Endangered and Threatened Wildlife and Plants: Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States, dated February 4, 2013, found at http://federalregister.gov/a/2013-0148. It has a global rank of G4, and is a State threatened species.

Wolverine is a solitary and highly mobile species that tends to inhabit remote areas and occurs at relatively low densities (Banci 1994). Wolverines range widely from subalpine talus slopes to big game winter ranges, occupying higher ranges in the summer and riparian habitats in the spring. Ruggiero et al (1999) found that wolverines used higher elevations in the snow-free season to avoid high temperatures and human activity. Wolverine habitat is best defined in terms of adequate year-round food supplies in large sparsely inhabited areas, rather than in terms of particular types of topography or plant associations. No particular habitat components or habitat management techniques can presently be singled out for wolverine and success of wolverine may relate to the availability of large areas of remote, rugged uplands that are difficult to access by humans (Hatler 1989). Wolverines occur in low densities in all places they have been studied (Ruggiero et al. 1994). This is generally attributed to naturally low reproductive rates and delayed sexual maturity of the species.

Wolverines are opportunistic feeders and consume a variety of foods depending on availability. They primarily scavenge carrion, but also prey on small mammals and birds, and eat fruits, berries and insects (USDI Fish and Wildlife Service 2010). In both Montana and Idaho, big game carrion appears to be the major food source with snowshoe hare, squirrels, and small mammals making up the rest of their diet (Hornocker and Hash 1981). Large mammal carrion is an important dietary component, particularly in winter when other prey is scarce (Banci 1994, Pasitschniak and Lariviere 1995) and they rely heavily on the presence of other predators. Wolverines will also search for caches made by itself, other wolverines, or other carnivores during the winter.

Female wolverines use two kinds of dens for reproduction. Females use natal (birthing) dens to give birth and raise kits early postpartum, prior to weaning. They are excavated in snow and persistent, stable snow greater than 5 ft. in depth appears to be a requirement for natal denning, (USDI Fish and Wildlife Service 2013a). In Montana, natal dens occur above 7,874 feet and are located on north aspects in avalanche debris typically in alpine habitats near timberline (USDI Fish and Wildlife Service 2013a). Prior to weaning, females may move kits to one or multiple alternate den sites, referred to as maternal dens. The movement of kits from natal to maternal dens may be a response by the female to den disturbance, better food availability in the new location, predation risk, or deteriorating den conditions in the natal den (Magoun and Copeland 1998).

Post-weaning dens are called rendezvous sites. These dens may be used through early July. Females leave their kits at rendezvous sites while foraging, and return periodically to provide food for the kits. These sites are characterized by natural (unexcavated) cavities formed by large boulders, downed logs (avalanche debris), and snow (Inman et al. 2007). They may also occur in talus or coniferous riparian zones.

Wolverine home ranges are generally extremely large and the availability and distribution of food is likely the primary factor in determining wolverine movements and home range. Home ranges of adult wolverines range from less than 38.5 square miles to 348 square miles (USDI Fish and Wildlife Service 2010). Home ranges of adult males and females overlap extensively with the range of one male covering the ranges of two to six females, which is considered one reproductive unit.

Witmer et al. (1998) suggested long-term conservation of wolverine can be achieved through maintenance of large, remote areas of habitat and engaging in management activities that do not decrease ungulate prey density.

Threats

Wolverines have few natural predators although both interspecific and intraspecific mortalities have been documented. Wolverines are susceptible to mortality through hunting and trapping and human caused disturbances near den sites (Banci 1994, Hornocker and Hash 1981, Copeland 1996). Wolverine naturally occur at low densities (Hornocker and Hash 1981, Copeland 1996) and within the area known to currently have wolverine populations, relatively few wolverines can coexist due to their naturally low population densities.

In their proposed rule to list the wolverine as threatened (USDI Fish and Wildlife Service 2013a), it was determined that the impacts of climate change constitute a threat to the contiguous U.S. DPS of the wolverine. Wolverine populations in the remaining U.S. range appear to be at numbers so low that their continued existence could be at risk. These risks come from three main factors: (1) small total population size, 2) effective population below that needed to maintain genetic diversity and demographic stability, and 3) fragmented nature of wolverine habitat in the contiguous United States that results in smaller, isolated island patches separated by unsuitable habitats. Other threats are secondary and only rise to the level of threats to the DPS as they may work in concert with climate changes to affect the third risk factor; habitat. In their finding on the wolverine DPS, the USFWS discussed a variety of impacts to wolverine habitat including: (1) climate change, (2) human use and disturbance, (3) dispersed recreational activities, (4) infrastructure development, (5) transportation corridors, and (6) land management. The primary impact of climate change on wolverines is expected to be changes to the availability and distribution of wolverine habitat.

Project Area Status

Prior to 1973, wolverines were classified as furbearers in Oregon. Numerous animals have been collected or sighted around the northwest. A query of the Oregon Natural Heritage database reveals that there are about 150 observations of wolverines in Oregon, with most occurring in the mountainous northeast (Baker, Grant, Umatilla, Union and Wallowa Counties) region (ODFW 2013). Although recent sightings, tracks and a road kill document their presence (Csuti et al 2001), they are considered rare throughout all of Oregon, Washington, Idaho, and California.

Periodically throughout the 1990s, wolverine surveys were conducted across the Forest. Records for eastern Oregon include a partial skeleton and tufts of fur found near Canyon Mountain, Grant County (1992), tracks and a possible denning site discovered in the Strawberry Mountain Wilderness (1997), tracks that were noted in the Monument Rock Wilderness (1997), and hair and track collection on Snow Mountain Ranger District, Ochoco National Forest (1992). There have been additional unconfirmed sightings reported periodically on the Forest although there are no recent verified locations or physical evidence of their occurrence. Sightings are mostly from wilderness, or more remote, high-elevation areas.

In the Blue Mountains, source habitat for wolverine occurs primarily in wilderness and large roadless areas, although no den sites have been identified. Areas of low human impacts, low human disturbance, and high deer and elk concentrations are preferred. The best source habitat is located in the Strawberry Mountain Wilderness, Monument Rock Wilderness, Vinegar Hill-Indian Rock Scenic Area, the Jump off Joe, Dixie Butte and Dry Cabin Wildlife Emphasis Areas, and the Shaketable, McClellan Mountain, Aldrich Mountain Roadless and Baldy Mountain Roadless Areas.

Collectively the Forest includes approximately 82, 555 acres of wilderness and approximately 180, 822 acres of roadless areas and these lands are most likely to be used for denning or dispersal. Potentially suitable den habitat exists on approximately 1,200 acres forest-wide, with 430 acres occurring in more remote wilderness or roadless areas. Of this, almost 80 percent occurs in the Strawberry wilderness. Because deep, persistent snow is characteristic of dispersal habitat (Schwartz et al 2009), wolverine dispersal habitat is more likely to occur on upper elevation ridges and mountains, whereas potential foraging habitat occurs across much of the Forest.

Invasive plants have not been identified as a primary threat to wolverine. Of the 1,200 acres of den habitat, known infestations of invasive plants occur on less than one acre. The low level of invasive weeds is likely a result of the low management/use levels associated with wilderness/roadless areas, although extensive surveys have not been conducted in remote areas of the Forest.

Yellow-billed Cuckoo

Status, Life History and Habitat Description

The yellow-billed cuckoo in the western United States was accorded federal candidate status in July 2001. On October 3, 2013, the Western U.S. DPS was proposed as a threatened species under the Endangered Species Act (USDI FWS 2013c). Historical records for the state show that breeding cuckoos were most often sighted in willow bottoms along the Willamette and Columbia Rivers (USDI FWS 2013c).

Western yellow-billed cuckoos breed in dense willow and cottonwood stands in river floodplains. They are migratory, arrive in Oregon in mid-May and fly south to their wintering grounds in September. Cuckoos eat large insects including caterpillars and cicadas and, occasionally small frogs and lizards. Breeding coincides with the emergence of cicadas and tent caterpillar (USDA FWS 2013c). In California, caterpillars and katydids appeared to be preferred foot, whereas white tree frogs and grasshoppers were utilized more while raising young (California PIF 1998).

Western cuckoos breed in large blocks of riparian habitats, particularly woodlands, cottonwoods (*Populus fremontii*) and willows (*Salix sp*.). Dense understory foliage appears to be an important factor in nest site selection, while cottonwood trees are an important foraging habitat in some areas. At the landscape level, the amount of cottonwood-willow dominated vegetation cover and the width of riparian habitat appeared to influence cuckoo distribution and abundance. Although yellow billed cuckoos occasionally lay eggs in the nests of other birds (USDI FWS 2011b, USDI FWS 2001), unlike other cuckoos, they often build their own nests. Nests are usually loose platforms of twigs lined with leaves or finer material and in the West are often placed in willows, cottonwoods and shrubs (Washington Dept. of Fish and Wildlife 2012). Cuckoos require horizontal branches for nesting, and nest tree height varies from approximately 10 to 25 feet above the ground with dense understories (Center for Biodiversity 1998, California PIF).

The cuckoo is likely even more sensitive to habitat loss than other riparian obligate species, such as the willow flycatcher, because it is dependent on the combination of a dense willow understory for nesting, a cottonwood overstory for foraging and large patches of habitat in excess of 50 acres (Center for Biodiversity 1998). It is also not known to utilize non-native vegetation in the majority of its range (Center for Biodiversity 1998).

Threats

Historically, the yellow-billed cuckoo bred throughout much of North America. Available data suggests that within the last 50 years the species’ distribution west of the Rocky Mountains has declined substantially, although this species probably was never common in Oregon (USDI FWS 2013c). Loss of streamside habitat is regarded as the primary reason for the population decline. The greatest threat to the species has been reported to be loss of riparian habitat and it has been estimated that 90 percent of the cuckoo's stream-side habitat has been lost. Habitat loss in the west is attributed to agriculture, dams, and river flow management, overgrazing and competition from exotic plants such as tamarisk. Activities which alter or destroy riparian habitat are of particular concern, including un-managed cattle grazing that contributes to the loss of sub-canopy vegetation and cottonwood regeneration (USDI FWS 2013c).

Project Area Status

In Oregon, the last confirmed breeding records were in the 1940s. However, four cuckoo sightings were made west of the Cascade Mountains between 1970 and 1994, and at least 20 records east of the Cascades. A 1988 survey in eastern Oregon and Klamath County located no birds, but identified potential breeding habitat along the lower Owyhee River (Littlefield 1988, p. 34 *In* USDI FWS 2011b). Most recent records were from May and June of 1999 (Johnson and O'Neil 2001, pp. 460–461) and a single yellow-billed cuckoo was sited during the breeding season (June 26-27 1999) along Bonita Road in Malheur County (approximately 15 miles east of the project area) (USDI FWS 2011b). Recent records of cuckoos are from eastern Oregon are at the Malheur National Wildlife Refuge in Harney County, approximately 30 miles south of the project area and from Malheur and Deschutes counties (USDI FWS 2013c).

Suitable habitat was identified by using Oregon GAP data including cottonwood riparian woodlands and willow riparian floodplain habitat. Approximately 2,136 acres of suitable habitat was identified along the Middle Fork of the John Day River. Approximately 28 acres of this suitable habitat is proposed for treatment.

Sensitive Species

Several terrestrial mammals, birds, amphibians and invertebrate species found or suspected to be on the Malheur National Forest (MNF) are Forest Service Sensitive Species (USDA FS 2011a). Management of Forest Service Sensitive Species is a proactive approach for meeting the Agencies obligations under the Endangered Species Act and the National Forest Management Act (NFMA), and National Policy direction as stated in the 2670 section of the Forest Service Manual and the U.S. Department of Agriculture Regulation 9500-4. The primary objectives of the Sensitive Species program are to ensure species viability throughout their geographic ranges and to preclude trends toward endangerment that would result in a need for federal listing. Species identified by the Fish and Wildlife Service as "candidates" for listing under the ESA, as well as species that have been de-listed from ESA are managed as R6 Sensitive Species (USDA FS 2011a). Other species of regional and local conservation concern are also managed as Sensitive Species. This section contains a general description of the species' life history, project area habitat and threats. The two woodpeckers shown below are also Management Indicator Species.

Table 8 displays forest sensitive species, which were identified from the Region 6 sensitive species list (USDI FS 2011a).

Table 8: Regionally Sensitive Species

Common Name	Scientific Name	Species Status[2]	Project Area Documentation[1]
Mammals			
Gray Wolf (Northern Rocky Mtn. DPS)	*Canis lupus*	DL east of Hwy 395, S	S
Pygmy rabbit	*Brachylagus idahoensis*	S	S
Townsend's Big-eared Bat	*Corynorhinus townsendii*	S	D
Pallid Bat	*Antrozous pallidus*	S	S

Common Name	Scientific Name	Species Status[2]	Project Area Documentation[1]
Fringed Myotis	*Myotis thysanodes*	S	S
Birds			
Bald eagle	*Haliaeetus leucocephalus*	DL, S	D
American peregrine falcon	*Falco peregrinus anatum*	DL, S	D
Grasshopper Sparrow	*Ammodramus savannarum*	S	S
Wallowa Rosy Finch	*Leucosticte tephrocotis wallowa*	S	S
Greater Sage Grouse	*Centrocercus urophasianus*	C, S	D
Bufflehead	*Bucephala albeola*	S	D
Upland Sandpiper	*Bartramia longicauda*	S	D
Bobolink	*Dolichonyx oryzivorus*	S	D
Lewis' woodpecker	*Melanerpes lewis*	S	D
White-headed woodpecker	*Picoides albolarvatus*	S	D
Amphibians			
Columbia spotted frog	*Rana luteiventris*	C, S	D
Invertebrates			
Shortface lanx	*Fisherola nuttalli*	S	S
Johnson Hairstreak	*Callophrys johnsoni*	S	S
Silver-bordered Fritillary	*Boloria selene*	S	D
Harney Basin Duskysnail	*Colligyrus depressus*	S	D
Columbia Clubtail	*Gomphus lynnae*	S	S

1 – D – species had been recently documented, S-species suspected to occur or that may have suitable habitat
2 – C- candidate for ESA listing, DL-delisted from ESA, S-Region 6 Sensitive Species

Gray Wolf

Habitat and Threats

The gray wolf is a habitat generalist inhabiting a variety of plant communities, typically containing a mix of forested and open areas with a variety of topographic features (Verts and Carraway 1998, Witmer et al. 1998). Habitat can include forests of all types, rangelands, brushland, steppes, agricultural lands, wetlands, deserts, tundra, and barren ground areas, although the gray wolf appears to be more prey dependent than cover dependent. Prey species include white-tailed and mule deer, moose, elk, woodland caribou, bighorn sheep, mountain goat, beaver, and snowshoe hare, with small mammals, birds, and large invertebrates sometimes being taken, although ungulates comprise 90 percent or more of their diet (USDI FWS 1987). They are also opportunistic feeders and will prey on carrion when it is available (Witmer et al. 1998).

Wisdom et al. (2000) suggested four major challenges to wolf conservation within the Interior Columbia Basin: excessive mortality from humans, mortality related to roads, displacement from habitat by human activities and population isolation. Consequently the ability of wolves to persist will be determined largely by the degree of human tolerance for the species (Oregon DFW 2005).

Project Area Information

In Oregon, wolves have increased steadily since re-introduction and wolf numbers are currently well above recovery objectives. In northeastern Oregon suitable habitat includes Eagle Cap, Wenaha-Tucannon, North Fork John Day, Strawberry Mountain wilderness areas, Hells Canyon NRA, designated roadless areas on public lands and areas characterized by low density of open roads. Such areas would be characterized as highly suitable because human densities and activity levels are low, whereas ungulate numbers are considered adequate to support wolves (Oregon DFW 2005).

The Idaho wolf population has been increasing steadily, and dispersal into the Blue Mountains is expected to continue (Oregon DFW 2005). In July 2008, a wolf pack that includes both adults and pups was confirmed in a forested area of northern Union county and was the first evidence of multiple wolves and wolf reproduction in Oregon. By the end of 2012, Oregon's minimum wolf count included 53 wolves including seven packs and at least five breeding pairs. Another breeding pair was added in February 2013 (Oregon DFW 2013b and c).

While occasional wolf sightings are reported, the gray wolf has not been confirmed within the project area. Wolf sighting information to date seems to indicate transient or lone individuals that are not part of a resident pack. However the project area provides suitable remote forest habitat and supports large populations of big game (Oregon DFW 2005). As a result and considering that a pack has been documented approximately 75 miles northeast in Union county, it is likely that over time wolf use could occur within the project area.

Although foraging or dispersal habitat is relatively widespread, remote habitat suitable for denning or rendezvous sites is restricted to relatively un-roaded areas. Consequently suitable wolf habitat largely occurs within wilderness and roadless areas, which make up almost 263,377 acres on the Forest.

Currently, about 16 acres of invasive plants have been mapped within wilderness/roadless lands on the MNF. However as described under wolverine, due to the lack of surveys in these remote areas, infestations may be larger than is currently documented. Although not a direct threat to wolves, invasive plants may adversely affect the quality of habitat for big game populations.

Pygmy Rabbit

Habitat and Threats

Oregon populations of pygmy rabbits are listed as a species of concern under the Endangered Species Act (USDI FWS 2013b). They typically occur in areas of tall, dense sagebrush (*Artemisia spp.*) cover and are highly dependent on sagebrush to provide food, cover and protection from predators throughout the year (USDI FWS 2005c, USDI FWS 2013b). The winter diet of pygmy rabbits is comprised on up to 99 percent sagebrush. While big sagebrush is the main food of this species, native grasses and forbs are also eaten in mid-late summer. Also there is evidence that pygmy rabbits prefer native grasses as forage over other foods during this period (USDI FWS 2005c).

These rabbits may be active at any time of the day or night, although most activity occurs during mid-morning (USDI FWS 2005c). Pygmy rabbits dig their own burrows and need deep loose textured soils for burrow construction, although they occasionally make use of burrows abandoned by other species. As a result they may occur in areas of shallower or more compact soils that support sufficient shrub cover (USDI FWS 2013b).

Pygmy rabbits are slow and subject to predation in open areas. Predation is the primary cause of mortality among adults and juveniles and can be as high as 50 percent in the first five weeks of life (USDI FWS 2013b). Accordingly, pygmy rabbits tend to stay close to their burrows and have small home ranges, although home range size and movement distance is variable (U.S. Fish and Wildlife Service 2005c). Loss of sagebrush is the main reason for decline of pygmy rabbit populations (USDA FS 2013b). Agriculture, livestock grazing and associated developments, type conversions of big sagebrush to livestock forage, prescribed and wild fires, invasive plants, and roads also degrade their habitat. The invasive cheatgrass (*Bromus tectorum*) is of particular concern because it invades the understory of big sagebrush shrubs making a critical habitat site unsuitable for the rabbit (Weiss and Verts 1984). Cheatgrass and other invasive plants replace important forage species, introduce a perpetuating fire cycle into big sagebrush habitat (Whisenant 1990), may reduce predator detection, impede movement, and limit dispersal of the pygmy rabbit. McAdoo et al. (2004) stated that weed control is an example of the highest priority habitat treatments for sagebrush-associated wildlife and invasive plants are considered a threat to the rabbit's habitat (USDI FWS 2013b). Finally, due to its dependence on cover and limited dispersal ability, fragmentation of sagebrush habitat is considered a threat to this species (USDI FWS 2005c).

Project Area Information

The project area is near the northern boundary of this species range (USDI FWS 2005c) and historically, pygmy rabbits have been collected from Deschutes, Klamath, Crook, Lake, Grant, Harney, Baker and Malheur Counties in Oregon. However the range of the pygmy rabbit in Oregon may have decreased and boundaries of the current distribution are not known (USGS 2007). Not all potentially suitable sites appear to be occupied and populations are susceptible to rapid declines and local extirpation (Weiss and Verts 1984). Historical and suitable pygmy rabbit habitat was surveyed on State, Bureau of Land Management (BLM) and private land in Malheur, Harney, Lake and Deschutes Counties in 2004/2005 (USGS 2007). Sighting within Harney County indicate that this species occurs mainly in the sagebrush basin south of Burns Oregon. Also an active burrow was documented southeast of Burns, approximately 17 miles south of the MNF boundary (USGS 2007).

While there have been no Forest surveys conducted and pygmy rabbits have not been documented within the project area, suitable habitat exists. Using GIS and Oregon GAP data for big sagebrush communities, suitable pygmy rabbit habitat was identified on approximately 24,715 acres within the project area. However it is recognized that this is likely an overestimate of the acres of suitable habitat, since many sites would not have preferred cover and soil conditions. Fewer than 10 acres of invasive plants have been documented within suitable habitat.

Townsend's Big-eared Bat

Habitat and Threats

Townsend's big-eared bats inhabit a wide variety of habitats from old-growth forests to desert. It roosts in caves, mines, rock crevices, buildings, and bridges and hollows of trees, but is primarily cave-dependent. The Townsend's big-eared bat is a moth specialist with over 90 percent of its diet composed of moths. It captures prey in flight or by gleaning from foliage (Csuti et al. 2001). They forage in edge habitats along streams and woodlands, and within a variety of wooded types. They can travel long distances while foraging, including movements of over 90 miles during a single evening (WBWG 2005).

The primary threat to the Townsend's big eared bat is disturbance and/or destruction of roost sites (e.g. recreational caving, mine exploration, mine reclamation) and studies in Oregon and Washington have reported sizeable reduction numbers due to human visitation and mining (WBWG 2005). Invasive plants are not considered a threat to Townsend's big-eared bats or their habitat.

Project Area Information

Townsend's big eared bats have been documented from all five project area counties (Natureserve 2013). Also they have been recently documented on the Emigrant Creek district, and from caves in Dayville and the John Day fossil beds, approximately ten miles east of the project area (personal communication between Scott Reitz and Clark Reames 2013a).

Due to the variety of habitat utilized, foraging habitat occurs across the MNF, whereas roost and hibernacula occurs in buildings, bridges or other structures scattered across the project area. Suitable Townsend's big-eared foraging habitat includes forested and shrub habitat scattered across the project area and about 1,975 acres of mapped infestations have been documented within these habitats. Invasive plants do not pose direct threats to this species.

Pallid Bat

Habitat and Threats

The Pallid bat is a year-round resident and most commonly inhabits arid deserts and grasslands often near rock outcrops and water, and is less abundant in conifer and mixed forests. This bat usually roosts in rock crevices or buildings, and less frequently roosts in caves, tree hollows and mines. Oregon night roosts were in buildings, under rock overhangs, and under bridges. It prefers narrow crevices in caves as hibernation and shows strong fidelity to roosts both within and between years (Natureserve 2013). Pallid bats are opportunistic generalists that glean a variety of arthropod prey from surfaces, as well as capture insects on the wing (WBWG 2005). Food items include flightless arthropods, crickets, moths, beetles and may eat small vertebrates (Natureserve 2013, WBWG 2005). They forage over open shrub-steppe grasslands, oak, savannahs, open ponderosa pine forest, talus slopes, gravel roads and orchards (WBWG 2005).

Pallid bat' tendency to roost gregariously and are sensitive to disturbance. Loss of modification of foraging habitat due to prescribed fire, urban development, agriculture or pesticide use pose potential threats (WBWG 2005).

Project Area Information

The pallid bat has been documented from Haney, Grant and Malheur Counties (Natureserve 2013), including Goose Rocks and the Pallisades (John Day Fossil Beds), approximately 10 miles east of the project area. Suitable cliffline habitat occurs along the Malheur River canyon, Devine Canyon down to Burns, Oregon, along Middle Fork and Coyote Bluff, and this species has been documented at three mine sites in the Vinegar Hill area in 2009 and 2010 (personal communication between Scott Reitz and Clark Reames 2013a).

Potential roost and hibernacula occur in cliffline habitat along primary river corridors and in buildings or structures scattered across the forest. Pallid bat foraging habitat includes open canopy ponderosa pine stands, woodlands, grassland and shrub habitats, which occur on approximately 361,000 acres Forest-wide. Invasive plants have been documented across 428 acres of suitable habitat within the project area. Invasive plants are not a direct threat to this species.

Fringed Myotis

Habitat and Threats

The fringed myotis is a year-round resident in Oregon (Natureserve 2013). While distribution is patchy, it is most common in drier woodlands (oak, pinyon juniper and ponderosa pine), but is found in a variety of habitats including desert scrub, mesic coniferous forest, grassland and sage-grass steppe (WBWG 2005). This species roosts in buildings, underground mines, rocks, cliff faces, and bridges, although roosting in large decadent trees and snags is common. Maternity roosts are colonial, whereas males are thought to roost singly or in small groups. Hibernation occurs in caves, mines and buildings (WBWG 2005).

The fringed bat feeds on a variety of invertebrate taxa and the relative importance of prey items may vary according to prey availability, geography and season. The two most important items commonly reported in its diet are beetles (Coleoptera) and moths (Lepidoptera), however flightless taxa such as crickets and spiders have been reported. This species is adapted to foraging within the forest interior, as well as along forest edges. Modification or loss of roosting habitat is the primary threat, including human impacts to caves and hibernacula as well as reduction in forest and suitable snags. Chemicals that affect bats or their prey are also a threat (WBWG 2005).

Project Area Information

The fringed myotis has been documented from Haney and Grant Counties (Natureserve 2013), including at the Dunstan Preserve (Middle Fork John Day). Due to the variety of habitat utilized, foraging habitat occurs across the MNF, whereas roost habitat occurs within mature forested habitat, as well as in caves and buildings and along clifflines. While invasive plants are not considered a direct threat to this species, approximately 2,124 acres of suitable foraging/roost habitat currently contain invasive plants.

Bald Eagle

Habitat and Threats

Bald eagles are protected under the migratory bird treaty act (USDI FWS 2008a) and the Bald and Golden Eagle Protection Act, whereas management direction is outlined in the Bald and Golden Eagle Protection Act (USDI FWS 1999b).

Bald eagles are most common along coasts, major rivers, lakes and reservoirs (U.S. Fish and Wildlife Service 1986), and require accessible prey and trees for suitable nesting and roosting habitat (USDI FWS 2007a). Food availability, such as aggregations of waterfowl or salmon runs, is a primary factor attracting bald eagles to wintering areas and influences the distribution of nests and territories (Stalmaster 1987). Bald eagles feed primarily on fish during the breeding season, and eat waterfowl, seabirds and carrion during the winter (U.S. Fish and Wildlife Service 1995).

Bald eagles usually nest in trees near water, but are known to nest on cliffs and (rarely) on the ground. Nest sites are usually in large trees along shorelines in relatively remote areas that are free of disturbance. Adults tend to use the same breeding areas year after year, and often the same nest, though a breeding area may include one or more alternative nests (U.S. Fish and Wildlife Service 1999a). Wintering eagles can be found concentrated at salmon spawning areas and waterfowl wintering areas and a communal winter roost generally hosts several eagles each evening at the same site. Winter roosts also tend to offer more protection from the weather than diurnal roosts (USDI 1986). Isolation is an important feature of winter and night roosts, which are usually located in remote areas with less human disturbance.

A current threat to bald eagles is mortality caused by a new disease, avian vacuolar myelinopathy (AVM) (U.S. Fish and Wildlife Service 1999a). A recent hypothesis implicates a type of cyanobacteria that grows on the invasive aquatic plant, *Hydrilla verticillata* (Wilde, 2004). The cyanobacteria are thought to produce a neurotoxin that is fatal to herbivorous birds and their avian predators. Mortalities caused by AVM can have localized impact on bald eagles but there is currently no evidence that the overall recovery of the population is affected (U.S. Fish and Wildlife Service 1999a). The invasive aquatic plant, *Hydrilla verticillata* is not known to occur within the project area.

Bald eagles are still protected by The Bald and Golden Eagle Protection Act, The Lacey Act, and the Migratory Bird Treaty Act, whereas management direction is provided in the National Bald Eagle Management Guidelines (USFWS 2007b). The guidelines contain recommendations for avoiding disturbance to nesting, roosting, and foraging eagles. Agencies are also directed by the Recovery Plan to address the issues of forested habitat management, prey species management, forest insect risk management, and contingency planning for wildfire risks to eagle habitat.

Project Area Information

The Malheur National Forest has four known bald eagle nest sites, including two nests on the Emigrant Ranger District (Silvies River and Delintment Nests) and two nests on the Blue Mountain District (Galena and Bear Valley). Also two nests occur immediately south of the proclamation boundary on Bureau of Land Management (BLM) administered lands (personal communication between Clark Reames and Howard Richburg 2013b). The Silvies River and Delintment Lake territories fall within the Harney Basin/Warner Mountains recovery zone (RZ21), which has a habitat management goal of 16 nesting territories and a population goal of 10 breeding pairs of bald eagles. The Blue Mtn. nests falls within the Blue Mountains recovery zone (RZ9), which has a habitat management goal of 14 nesting territories and a population goal of 8 breeding pairs of bald eagles.

There are four designated bald eagle winter roosts on the MNF (Management Area 5) which total 2,507 acres. Eagles typically arrive in early November and depart about the end of April. The birds often utilize private lands in the valleys during the day and fly to different roost areas on the MNF in the evening. The Rattlesnake and Coffeepot roosts are located on the Emigrant Creek District along the southern edge of the MNF. Roosts on the Blue Mountain Ranger District are on the perimeter of Bear Valley. Winter bird count surveys are conducted annually; the Emigrant Creek roost sites get consistent high use, peaking at about 50 to 70 birds. The Blue Mountain roost sites are used annually but only support a few eagles. The LRMP establishes management area direction for communal winter roost areas, which includes maintaining the integrity of the roost sites, maintaining large diameter trees, and minimizing or avoiding disturbance during roosting periods. Seasonal closures are typically applied to management activities from December 1st through April 1st to help minimize disturbance.

Invasive plants do not pose a direct threat to the bald eagle. Infestations have been mapped within three acres of designated winter roost and nine acres of infestations are mapped within one-half mile of the Bear Valley nest

American peregrine falcon

Habitat and Threats

Peregrine falcons that inhabit cliffs located generally within approximately 0.5 miles of riparian habitat (source of prey). Peregrines are aerial predators who feed mostly on birds. Much of the prey consists of species the size of pigeons and doves; however avian prey ranges in size. Disturbance by human activity during the nesting season can cause nest sites and new territories to be abandoned, egg breakage, or diversion of adult attention. Peregrine falcons in the Pacific Northwest are most affected by bio-accumulation of contaminants, and direct disturbance (Pagel 2006). Invasive plants do not adversely affect peregrine falcons.

Project Area Information

While there are no known nest sites, peregrine falcons have been observed on the MNF. Use occurs seasonally as individuals migrate through the area in the spring and fall.

In 1992, surveys to identify probable nest sites were conducted on the Malheur National Forest. Cliff systems were rated high, medium or low potential as hack sites or cross-foster locations. Sixteen cliff systems were surveyed. Locations included: Aldrich Mountain, Baldy Mountain, Canyon Mountain, Coyote Bluffs, Fields Peak, Nipple Butte/lake Butte, Malheur River Canyon/Black Canyon, McClellen Creek, Moon Mountain, Riley Creek, Ragged Rocks, Silvies Canyon, and multiple cliff systems in and around Strawberry Lakes. Most of the cliff systems are located along the series of mountain ranges that parallel the John Day Valley on the south side of the valley, primarily the Aldrich and Strawberry Mountains on the Blue Mountain and Prairie City Ranger Districts. Coyote Bluffs and Ragged Rocks are located in the Middle Fork John Day River drainage on the Blue Mountain Ranger District. Silvies Canyon is located south on the Emigrant Creek District. The Malheur River Canyon cliffs are located on the Prairie City Ranger District. Strawberry Lakes was rated high potential for nesting habitat; Ragged Rocks and Black Canyon were rated medium to high potential. The remaining cliff systems were rated medium to low potential. Sites have been periodically surveyed but no nesting peregrines have been identified at any of the sites.

While there are no nest sites known to occur on the MNF, suitable foraging habitat occurs across the project area.

Grasshopper Sparrow

Habitat and Threats

Although this species has a widespread distribution, it often breeds locally and is considered rare or uncommon in much of its range (Slater 2004). In Oregon it is considered one of the more enigmatic and erratic birds and a small population may appear in an area, persist for a few years, and then disappear, only to return in the future. Suitable habitat in the state is concentrated north of the project area in Morrow, Umatilla and Gillam Counties, although suitable grassland habitat occurs in both Harney and Malheur Counties (Oregon State University 2013).

The grasshopper sparrow is found in a variety of open grassland types, is area sensitive and large tracks of grassland are more likely to support populations (Slater 2004, PIF 2000, Dechant 2002a). They prefer grasslands of intermediate height and are often associated with clumped vegetation interspersed with patches of bare ground. Other habitat requirements include moderately deep litter and sparse coverage of woody vegetation and shrubs (Natureserve 2013, Slater 2004, Oregon DFW 2013, Janes 1983, Dechant 2002a). In Morrow county the grasshopper sparrow is occurs at low densities and Holmes and Miller (2010) found that grasshopper sparrows were most numerous in perennial grasslands and least abundant in depleted sagebrush and sagebrush/annual grass communities.

The grasshopper sparrow forages almost exclusively on bare ground and eats insects, other small invertebrates, grain and seeds (Natureserve 2013). During the breeding season grasshoppers (*Orthoptera*) have been documented comprising the majority (greater than 60 percent) of their diet, with seeds taken secondarily (Slater 2004). The greatest threats to grassland species such as the grasshopper sparrow includes continued habitat loss due to encroachment of woody vegetation (Oregon DFW 2013, Slater 2004), habitat fragmentation and habitat degradation from grazing and fire (Slater 2004). Conservation issues specific to the grasshopper sparrow in the Columbia basin (Altman and Holmes 2000) include; 1) conversion of bunchgrass habitat to agriculture, 2) alteration of bunchgrass habitat from intensive grazing and exotic grass/forb invasions, 3) vulnerability due to agricultural use, 4) shrub encroachment from overgrazing and fire suppression, and 5) early season mowing.

Project Area Information

While the grassland sparrow has not been documented on the MNF, larger grassland habitat greater than 20 acres in size exists on 46,523 acres. Approximately 71 acres of invasive plants have been mapped within this habitat. However this would be considered an overestimate of suitable habitat because not all acres would have the structural characteristics preferred (i.e. clumped vegetation of intermediate height with patches of bare ground). Also in many areas they have been documented preferring grasslands greater than 75 acres in size (Natureserve 2013).

Wallowa Rosy Finch

Habitat and Threats

This species is restricted to the Wallowa Mountains in Northeast Oregon and winters to West-Central Nevada (Clements 2012). Like *Leucosticte tephrocotis*, the Wallowa rosy-finch breeds on the highest alpine peaks, as well as in barren cirques below timbered peaks on the Wallowa Mountains. Young remain with adults until fall and they move to lower altitudes and latitudes during the winter (OSU 2013). Nests are usually in rock crevices or holes in cliffs. Foraging occurs on the ground for seeds and in the spring they glean wind-transported insects from snow. Later in the season they may glean insects from vegetation or may chase flying insects in the air (Natureserve 2013). While most high elevation habitats are protected, this species can be most benefitted by monitoring and protection of known sites.

Project Area Information

Habitat locations for this species have not been mapped on the MNF. However, habitats are not likely to be infested with invasive plants because they lie in remote, high elevation areas that are distant from primary invasive plant vectors. Thus, potentially suitable habitat is not likely to be infested with invasive plants, and invasive plants are not a direct threat to the Wallowa rosy finch.

Greater Sage Grouse

Status and Habitat Description

A Greater Sage Grouse and Sagebrush Habitat Conservation Team, consisting of state and federal agencies, private landowners, conservation groups and academics, was established in 2001 to craft a comprehensive set of planning guidelines for sage grouse and sagebrush habitats in

Oregon. The primary goal of the guidelines is to maintain existing sagebrush-steppe habitats in order to sustain sage grouse populations and protect options for future management

Sage grouse breed on sites called leks (strutting grounds) in March-April. The same lek sites tend to be used year after year and they are established in open areas surrounded by sagebrush, which is used for escape and protection from predators (Connelly et al. 1991). Optimum sage grouse nesting habitat consists of a healthy sagebrush ecosystem including sagebrush plants and an herbaceous understory composed of grasses and forbs.

Sage grouse nesting and early brood-rearing occurs in April-June, which is considered a critical time for sage grouse. Early brood-rearing generally occurs relatively close to nest sites; however, movements of individual broods may be highly variable. Hens with broods tend to select habitats having a wide diversity of plant species that tend to provide an equivalent diversity of insects that are important chick foods. In June and July, as sagebrush habitats dry and herbaceous plants mature, hens usually move their broods to moister sites in or adjacent to sagebrush cover where more succulent vegetation is available (Connelly et al. 1988). Examples of such habitats include low sagebrush (*Artemisia nova; A. arbuscula*) plant communities, wet meadows and riparian areas (Connelly et al. 1988).

Major threats to the species are habitat conversion and degradation. Declines in sage grouse populations have been linked to agricultural conversion, rangeland conversion, livestock management, wildfire, prescribed fire, fire rehabilitation, structure and infrastructure development, juniper expansion, and invasions of exotic species (Blus et al. 1989; Braun 1987, Braun 1998, Connelly et al. 2000, Quigley and Arbelbide 1997, Swensen et al. 1987, Wisdom et al. 2000, USDI Fish and Wildlife Service 2003c).

Cheatgrass (*Bromus tectorum*) invasion has particularly degraded sage grouse habitat by altering fire cycles in the sagebrush-steppe ecosystem (Crawford et al. 2004). The presence of cheatgrass fills in voids between shrubs and will carry frequent fires in the same areas. The frequent fires prohibit re-establishment of the big sagebrush and create cheatgrass monocultures that are unsuitable for sage grouse. Additional threats include herbicide and insecticide use (Crawford et al. 2004). Insecticide application to alfalfa fields in Idaho resulted in mortality to sage grouse that fed on contaminated insects (Blus et al. 1989, Connelly et al. 1991). Herbicides were commonly used in sage grouse habitat until the1980s to reduce cover of sagebrush and increase livestock forage and these habitat alterations created areas unsuitable for sage grouse.

Project Area Information

The largest sagebrush habitats are located on the Emigrant Creek and Prairie City Ranger Districts, particularly along the southern boundary of the MNF where sagebrush shrublands extend off the MNF and on to BLM lands. Habitat on NFS land is often considered marginal when compared to larger expanses of habitat located on BLM and private lands to the south of the MNF and in larger valleys such as Bear Valley and Silvies Valley. On the northern half of the MNF, sage brush habitats are small and highly fragmented. There have been incidental sightings of sage grouse on the MNF, but sightings are uncommon. There are no documented leks or key brood-rearing habitat identified. Sage grouse use appears to be occasional and random within suitable habitat.

In 1993, Oregon Department of Fish and Wildlife (ODFW) biologists estimated that Bear Valley had about 60 birds and a stable population. In 2003, ODFW revised the 1993 estimates and believe grouse populations in Bear Valley may have declined, primarily due to predation (coyotes), but also because of livestock grazing and agricultural conversion. Approximately 139,500 acres of suitable habitat have been mapped on the MNF and 79 acres of invasive plants have been mapped within this habitat.

Bufflehead

Habitat and Threats

The bufflehead is a tree-nesting, diving duck whose population has declined throughout some of its range (Marshall et al. 2003). For nesting, it uses mountain lakes surrounded by woodlands with snags (mostly aspen, but it will use ponderosa pine and Douglas-fir). Buffleheads are common in parts of Oregon and Washington during winter, but are rare during the breeding season. Buffleheads eat animal matter, with common diet items including aquatic insects and larvae, physid snails, fish and sometimes herring eggs or salmon carrion. They also eat seeds of aquatic plants, such as smartweed, alkali bulrush, and sago pondweed (Marshall et al. 2003). Although no threats to buffleheads were identified, the lack of suitable breeding habitat (tree cavities adjacent to lakes) would be limiting in many areas.

Project Area Information

Although breeding has not been documented in eastern Oregon, the MNF provides stopover habitat during migration and buffleheads have been documented adjacent to the MNF in Bear Valley. Suitable habitat includes Forest lakes and wetlands, which occur on approximately 350 acres Forest-wide and these areas could be used as "stopover" habitat during migration. Currently less than an acre of suitable Bufflehead habitat is known to be infested with invasive plants. Invasive plants have been identified as a threat to waterfowl (Utah Division of Wildlife Resources 2009).

Upland Sandpiper

Habitat and Threats

Upland sandpipers are a rare breeder in large montane meadows within forests of eastern Oregon and are almost never observed away from their breeding grounds (Oregon DFW 2013). They generally nest in extensive, open tracts of short grassland habitat, including native prairie, dry meadows, pastures, domestic hayfields, and short-grass savanna, plowed fields along highway rights-of-ways and on airfields. Preferred habitat includes large areas of short grass for feeding and courtship with interspersed or adjacent taller grasses for nesting and brood cover (Dechant 2002b).

In the Blue Mountains, upland sandpiper habitat is large flat or gently rolling expanses of grassland in mountain valleys and open uplands with small creek drainages and wet to dry meadows. Use areas have a wide diversity of plants, and forb abundance is particularly important. Occurrence of upland sandpipers is positively correlated with patch size and they often utilize meadows which are generally at least 125 acres in size. They selectively nest where the vegetation is between 6 and 13 inches tall and avoid fields containing relatively uniform stands of grass, tall undisturbed stands of grass, or those seeded to smooth brome. Upland sandpipers have strong site fidelity, returning to the same area about the same time each year. Other key habitat features near nest sites are loafing and feeding areas that have shorter, sparser vegetation than nesting areas and the proximity of a small shrub or tree. Sandpipers are very secretive and easily disturbed by humans (Altman 2000).

Upland sandpipers feed primarily on insects, but also eat ants, berries, and seeds of grasses and forbs (Csuti et al. 2001). They prefer upland sites that have higher soil moisture than adjacent areas and foraging sites often had surface water during spring. A moderate threat to upland sandpiper habitat exists from declines associated with plowing of natural grasslands, degradation and fragmentation of habitat due to increased urbanization, farming practices and forest succession (Natureserve 2013).

Project Area Information

From the 1980's through 1991, numbers in Oregon were the largest population of nesting sandpipers west of the Rockies. Seven locations make up the Oregon population, and two of those areas are Bear Valley and Logan Valley on the Malheur National Forest. In Bear Valley and Logan Valley, numbers of nesting upland sandpipers have been declining since mid-1980s.

Bear Valley and Logan Valley locations accounted for over half of the sandpipers in the state in 1984, when 23 pair (7 nests) and 3 singles were found in Bear Valley, and 12 pair (2 nests) and 6 singles were found in Logan Valley. Nests have been found along ditches or near moist areas, often adjacent to sagebrush. Both Bear Valley and Logan Valley have areas of short grasses mixed with forbs and scattered sagebrush patches. The removal of sagebrush and the seeding of non-native grasses have altered the habitat in Bear Valley east of Highway 395, where upland sandpipers nested in the 1980s. Although bird numbers have declined, management has not changed in the rest of Bear Valley, which contains the majority of the occupied habitat. Logan Valley management has apparently changed and lodgepole pine has encroached in the valley. Water regimes and drainage patterns have also changed which have affected the character of the habitat

Potential upland sandpiper habitat includes all grassland and shrubland habitat that is 125 acres in size or more and on slopes of less than 25 percent (Dechant 2002b). Approximately 78,669 acres exist Forest-wide, although due to the height and structural preferences, preferred habitat would be less. About 72 acres of invasive plants have been mapped within the larger grassland/shrub habitats that provide potentially suitable habitat. Invasive plants such as knapweed have been identified as a threat to grassland habitats preferred by the upland sandpiper (USDA FS 2007).

Bobolink

Habitat and Threats

The bobolink is a bird of open prairies, grasslands, wet meadows, pastures, and grain crops. In Oregon, there are only a few disjunct populations that breed in irrigated hay meadows fringed with willows or in wet, grassy meadows with local growths of forbs and sedges. Many of these areas are mowed and/or grazed, which facilitates nesting of bobolinks. Bobolinks eat grass and forb seeds as well as insects. During the breeding season, more insects are included in the diet, especially caterpillars. Keys to management are to provide large areas of suitable habitat (native and tame grasslands of moderate height and density with adequate litter, controlling succession, and protecting nesting habitat from disturbance during the breeding season (early May to mid-July). Invasive plants such as knapweed have been identified as a threat to grassland habitats preferred by the bobolink (USDA FS 2007).

Project Area Information

Limited habitat exists in areas that have grasslands, wet meadows, willows or other water-loving shrubs. Oregon GAP data was used to identify potential bobolink habitat, which includes all, grasslands, wetlands, wet meadows and willow bottoms. These areas total 17,080 acres and 50 acres of invasive plants are known to occur on these lands.

Lewis' Woodpecker

Status and Habitat Description

Breeding habitat includes open forest and woodland, often logged or burned, including oak, coniferous forest (primarily ponderosa pine), riparian woodland and orchards and less commonly pinyon-juniper (Mellen-McLean 2012d, Natureserve 2013). Important habitat features include an open tree canopy, a brushy understory with ground cover, large dead trees and downed woody debris (DWD). They prefer open ponderosa pine at high elevations and open riparian vegetation at low elevations (Natureserve 2013, Altman and Holmes 2000).

Unlike other woodpeckers, this species seldom excavates its own cavity for nesting and greatest densities often occur in areas of high snag density, such as burned areas (Mellen-Mclean 2012a), In late summer, wandering flocks move from valleys into mountains and in winter this species uses oak woodlands and fruit orchards. Lewis' woodpeckers feed on adult emergent insects in summer and ripe fruit and nuts in the fall and winter. Unlike other woodpeckers, this species does not bore for insects but will take insects aerially (hawking), glean insects from tree branches or trunks, or drop from perch to capture insects on the ground (Natureserve 2013). Within the Columbia Plateau, historical levels of source habitat have declined by 95% (Altman and Holmes 2000) and this species has been locally extirpated in parts of its range (Altman et al 2000).

Project Area Information

While the Lewis' woodpecker has been documented from three counties within the project area (Grant, Crook and Baker) (Natureserve 2013), most of the existing sightings have occurred in burned areas. However scattered sightings have also occurred within ponderosa pine woodland and cottonwood riparian communities in the northern portion of the project area. Habitat for this species was identified by looking at; dry ponderosa pine with large snags and open canopies, cottonwood/willow communities, and more recent post fire (since 1990) habitat.

Currently approximately 275 acres of invasive plants have been mapped within the 311,700 acres of post-fire suitable habitat. Invasive plants are not considered a direct threat to forested habitat preferred by this species.

White-heated Woodpecker

Habitat and Threats

White-headed woodpeckers occur mainly in open ponderosa pine or mixed-conifer forests dominated by ponderosa pine, usually in old-growth or in stands with old-growth components. They excavate cavities in snags and also stumps, logs, and dead tops of live trees. Pine seeds are a major part of its diet in the fall and winter, although they also probe, glean, and pry off loss bark for insects and catch insects in the air. Over the course of the year, pine seeds and insects make up 60 percent and 40 percent of its diet respectively (Natureserve 2013). Populations in Oregon are decreasing due to fragmentation and a loss of forest cover (Audubon 2013).

Project Area Information

The white-headed woodpecker is currently documented from over 60 locations across the MNF with nesting confirmed in the ponderosa pine woodland community. Habitat for this species was identified by selecting dry ponderosa, Douglas fir and dry pine communities with an open canopy (10-40%) and tree sizes greater than or equal to 21 inches d.b.h. Using this criteria there are currently 21,509 acres of white-headed woodpecker habitat scattered across the project area. Of this acreage, invasive plants are known to occur on approximately 10 acres. Invasive plants are not considered a direct threat to this species.

Columbia Spotted Frog

Status and Habitat Description

The Great Basin Distinct Population Segment (DPS) of the Columbia spotted frog is a federal candidate species and is found in Oregon, Idaho, and Nevada. It has been documented on the Malheur, Ochoco, Umatilla, and Wallowa-Whitman National Forests. Columbia spotted frogs are highly aquatic and usually stay near permanent, quiet water along the grass and sedge margins of streams, lakes, ponds, springs, and marshes. Breeding habitats include a variety of relatively exposed, shallow-water (less than two feet), emergent wetlands such as sedge fens, riverine over-bank pools, beaver ponds, and the wetland fringes of ponds and small lakes. Vegetation in the breeding pools generally is dominated by herbaceous species such as grasses, sedges and rushes and froglets and adults live in well-vegetated ponds, marshes or slow, weedy streams that meander through meadows (Corkran and Thomas 2006). Springs may be used as over-wintering sites for local populations (Hayes et al. 1997). After breeding, adults often disperse into adjacent wetland, riverine and lacustrine habitats. Columbia spotted frogs are capable of long movements, including across uplands (Bull and Hayes 2001).

Larvae have a diet of algae, plant material, and other organic debris. Adults eat insects (ants, beetles, mosquito larvae, and grasshoppers, spiders, mollusks, tadpoles, crayfish, slug’s arthropods, earthworms and other invertebrate prey (Natureserve 2013, Hayes et al. 1997, Csuti et al. 2001). Threats to the species include mining, livestock grazing, road construction, agriculture, and direct predation by bullfrogs and non-native fishes. Also environmental stressors such as pesticides, herbicides, fertilizers, and heavy metals may slow reactions or cause behavioral changes that make spotted frog tadpoles more vulnerable to predation (Lefcort et al. 1998, Rosenshield et al. 1999, Marco et al. 1999, Bridges 1999b, Bridges and Semlitsch 2000).

Project Area Information

Columbia spotted frogs are believed to be in all sub-basins of the project area and this species is often found in natural ponds and lakes, rock pits, old mining ponds, livestock stockponds, and slow moving streams that retain water year-round. Spotted frog surveys have been conducted periodically since the 1980’s, and although not all areas of the MNF were surveyed, they did confirm that the species is fairly well distributed, but occurs at low levels. Most spotted frog sites found on the MNF have been found in small pools along perennial streams or in mining ponds and small lakes. Suitable breeding habitat was estimated using existing wetland habitat, sedge meadow habitat from Oregon GAP data and all lands within 300 feet of forest water bodies and springs. About 52 acres of invasive plants have been mapped within the approximately 58,700 acres of suitable habitat. This species could be affected by encroachment of invasive plants, especially in wetland habitats.

Shortface Lanx

Status and Habitat Description

This species is sporadically distributed in the Columbia River and a few major tributaries in Oregon, Washington, Montana and Idaho. In Oregon, healthy populations of shortface lanx persist in the Deschutes River and smaller populations occur in the John Day and Imnaha Rivers (USDA FS 2010a).

Shortface lanx are a non-migrant freshwater snail that can be found in the main channel of fast flowing streams and rivers. Habitat includes unpolluted, cold, well oxygenated streams and rivers between approximately 100 ft. and 300 ft. in width. They feed by scraping algae and diatoms from rock surfaces and require streams/rivers with a cobble/boulder substrate (USDA FS 2010a). Habitat loss and pollution are the primary threats to this species. Populations have been lost from most tributaries and almost all the Columbia River due to impoundments and the loss of rocky substrate (USDA FS 2010a)

Project Area Information

In Oregon the shortface lanx has been documented on the Wallowa Whitman National Forest and is suspected on the Malheur and Ochoco Forests (USDA FS 2010a). Suitable habitat includes approximately 16 miles of river habitat associated with the John Day and Malheur Rivers. Invasive plants are not considered a direct threat to this species, and there are no documented invasive plants within 100 feet of suitable habitat.

Johnson Hairstreak

Status and Habitat Description

Scattered sightings have been reported in Oregon in the Cascades Coast Range, Siskiyou Mountains, Blue Mountains and Wallowa Mountains (USDA FS 2011b) and are associated with old growth and mature forests. Habitats include clearings among conifer forests, especially mature ponderosa pine, although lodgepole pine, true fir, Douglas fir and western larch are also utilized (Pyle 2002). Larvae feed exclusively on aerial shoots of dwarf mistletoe (*Arceuthobium* species) and adults feed on the nectar of flowers in several families. All sightings in Washington and Oregon have been in coniferous forests (Pyle 2002).

Threats to this species include habitat loss, pesticides such as *Bacillus thuringiensis* and herbicides which are applied to flowering plants which this species visits. Also there is some evidence of hybridization with the thicket hairstreak (*C. johnsoni*) (USDA FS 2011b).

Project Area Information

While there have been no surveys on the MNF and this species has not been documented, Johnson’s hairstreak has been documented from Baker County (Oregon Biodiversity 2013) and use is possible. No suitable habitat for this species was identified within the project area but could occur in coniferous forest containing host plants. Invasive plants are not considered a direct threat to this species.

Silver Bordered Fritillary

In Oregon these butterflies have been found in Big Summit Prairie in Crook County, from the Strawberry Mountains in Grant County and from Baker County (USDA FS 2010b, Oregon Biodiversity 2013). Habitat for this species can be found in bogs, open riparian areas, and in marshes containing large amounts of Salix and larval food plants (Warren 2005 *In* USDA FS 2010b). Adults lay eggs on or near violets, usually marsh violet (*Viola palustris*) and bog violet (*V. nephrophylla*), whereas adults feed on nectar of various composites including mint and Verbena. Sunny habitat encourage adult flight and in Baker County annual broods are likely to occur from mid to late May, whereas Grant County populations fly between early June and Mid-August (USDA FS 2010b).

The silver-bordered fritillary is dependent upon maintenance of wet meadow habitat and its associated food plants. Downcutting of creeks and subsequent draining and drying out of meadow habitat, due in part to loss of beaver populations, loss of native plant species due to livestock grazing and invasion of non-native grasses are threats to this species.

Project Area Information

While not documented on NFS lands, silver-bordered fritillary have been documented on adjacent private land and use of suitable wet meadow habitat on the MNF is likely. Suitable habitat includes riparian/wetland non-forest communities identified from the MNF wetland and vegetation GIS layers, combined with Oregon GAP wet/sedge meadow habitat. Currently there are approximately 22,100 acres of potentially suitable habitat and of this 34 acres are known to contain invasive plants.

Harney Basin Duskysnail

Status and Habitat Description

To date in Oregon this species is only documented from the Silvies River drainage in Harney County and from the Fremont Winema National Forest in Lake County (USDA FS 2013). Little is known about the feeding habitats, growth, reproduction, or life span of this recently described species and hydrobiidae snails, in general feed on algae, diatoms, and detritus. Habitat includes shallow, cold with surrounding sage scrub vegetation (USDA FS 2013). While abundance estimates of this species have not been conducted, USDA FS (2013) noted very high abundance at one large spring site. Most rocks had many snails attached at this site and thousands of individuals were thought to be present.

Any modification of the cold-water spring environment where this species lives could be a potential threat to its survival. A number of habitat threats have been identified for this species including; livestock grazing, water and site degradation associated with recreation, and wildfire and retardant chemicals. Conservation strategies include protecting known sites and maintenance of water quality and substrate conditions (USDA FS 2013).

Project Area Information

This species has been documented within the project area (USDA FS 2013) within a large cold water perennial spring flowing out of a lava cliff. The springs create a fast, cold flow, are about 15 feet wide and one to eight inches deep. Fish are present and yellow monkey flower (*Mimulus* sp.), water cress (*Nasturtium* sp.) and other aquatic and riparian plants are prevalent. This relatively large spring is one of a series of smaller springs in the area, and appears to be a secure habitat for this species due to lava boulder field offering protection from grazing; however, part of the site is a favorite local recreational site that receives a high level of riparian disturbance and recreation in the creek (USDA FS 2013).

There are no known invasive plants at the Spring Creek site, although invasive plants are mapped in the surrounding watershed. Invasive plants are not considered a direct threat to this species.

Columbia Clubtail

Status and Habitat Description

In Oregon the Columbia clubtail is known to occur over a somewhat short stretch (about 15 miles) of the John Day River in Wheeler and Grant Counties and from a single location on the Owyhee River near Rome in Malheur County. Although this dragonfly is fairly common in areas where it is found, it has one of the most restricted ranges of any North American odonate (USDA FS 2012). This non-migratory dragonfly can be found in a variety of river habitats, which can range from sandy or muddy to rocky, shallow rivers with occasionally gravelly rapids. Water flow tends to be slow moving and larval river habitat is most critical. Eggs are laid in the water and after hatching, larvae burrow in the mud and overwinter. After emerging from the water, adults forage among shrubs from mid-June to mid-August (USDA FS 2012). Threats include activities that affect siltation or runoff and introduction of predatory fish (USDA FS 2012).

Project Area Information

While not documented on the MNF, it has been documented below the MNF boundary in the John Day River and suitable habitat is present. Forest wide there are approximately 100 miles of riverine habitat which may provide breeding and winter habitat. About 51 acres of invasive plants are mapped within 300 feet of riverine habitat in the project area. This species is not directly affected by invasive plants.

Management Indicator Species

Management Indicator Species (MIS) are selected species whose welfare is believed to be an indicator of the welfare of other species using the same habitat, or a species whose condition can be used to assess the impacts of management actions on a particular area (Thomas et al. 1979). Management Indicator Species on the Forest are identified in Table 9 and are grouped into three categories including 1) big game (commonly hunted species), 2) old growth, and 3) primary cavity excavators (PCE's). The following discusses MIS by the habitats they represent.

Table 9: Management Indicatory Species in the Project Area

Species	Representing	Habitat/Indicator
Rocky Mountain Elk	Big Game/commonly hunted species	General forest habitat conditions and winter range.
Pileated Woodpecker	Old Growth, Primary Cavity Nester, snags and downed wood	Late-successional coniferous forests with dense canopy, high basal area, and large diameter snags.
Pine Marten	Old Growth	Mature and old growth mesic coniferous forest with high structural diversity in the understory.
Three-toed Woodpecker	Old Growth	Old Growth Lodgepole Pine
Primary Cavity Excavators	Snags and downed wood	Dead/down (snag) habitat.
Northern Flicker	Primary Cavity Nester	Old Growth juniper.

Elk (Big Game)

Rocky Mountain elk was selected as an indicator species in the LRMP to represent general forest habitat and winter ranges. Concern over this species arises from its status as an important game species. Habitat quality for elk is evaluated in terms of forage, cover (satisfactory and marginal), elk screening, and open road density. The Habitat Effectiveness Index (HEI) model, (Thomas et al. 1988) will not be applied here because the model is not a suitable tool for evaluating invasive plant management effects on elk. In addition, there would be no change in cover or road density; therefore the habitat effectiveness index would not change from the existing condition due to management of invasive species. There is the potential to increase forage; however no treatment area is large enough to meaningfully change the habitat effectiveness index.

The quality of elk habitat is influenced by the presence of humans, which causes animal stress and hunting vulnerability. This is primarily associated with motorized use of open roads and the availability of vegetation (live and dead) to screen elk. Elk have been found to select habitats preferentially based on increasing distance from open roads (Rowland et al. 2000). Vulnerability and hunting mortality have been found to be higher in forested stands with greater road densities and less vegetation to provide screening.

Elk habitat on the Forest was mapped as part of a cooperative effort sponsored by the Rocky Mountain Elk foundation. Based on this, the project area contains an estimated 624,673 acres of elk winter range, whereas the entire Forest is used during the summer. Invasive plants have been documented on approximately 582 acres of the forest winter range and 2,124 acres of elk summer range. Of this, 517 acres (89 percent) of the winter range infestations and 1,860 acres (88 percent) of the summer range infestations are adjacent to roads. Approximately 500 acres of elk calving habitat also occur on the MNF, although there are currently no known invasive plants on these lands.

Invasive plant species management is not expected to impact Oregon state Management Objectives or hunting permits at this time. However, invasive plants probably affect deer and elk more than any other species analyzed in this section and can out-compete and replace native forage plants for these ungulates. Consequently eradicating, controlling and/or containing invasive plants would improve elk and deer habitat.

Old Growth

Old Growth Forest Plan, Management Area 13 (MA-13) provides for the management of old growth through a network of Dedicated Old Growth (DOG) areas and Replacement Old Growth (ROG) areas. Forest-wide, a total of 104,453 acres occur in the DOG/ROG network, which is managed in part to provide habitat for old growth MIS, including the pileated woodpecker, pine marten and three-toed woodpecker. The following sections describe life history and habitat descriptions for these species. There are 98 acres of invasive plants known to occur within the Forest DOG/ROG network.

Pileated Woodpecker

Pileated woodpeckers prefer late successional stages of coniferous or deciduous forest. Because they nest in large diameter snags, roost in large diameter hollow trees and use large logs and snags for foraging, pileated woodpeckers are associated primarily with older stands. Approximately 80 percent of the pileated woodpecker foraging in northeastern Oregon occurs in dead trees and dead and down logs (Mellen-Mclean 2012a).

The pileated woodpecker is fairly common throughout the Malheur National Forest in mature and late-successional mixed conifer forest and this species is documented in suitable habitat across the Forest. Forest-wide pileated woodpecker habitat was identified using two sources including old growth stands that are being emphasized for pileated woodpecker habitat, as well as stands that have the species and structural conditions characteristic of nesting, roosting and foraging (i.e. multi-story stands (OFMS), including an average overstory diameter of 20 inches d.b.h. or greater. There are approximately 224,197 acres of suitable pileated woodpecker habitat forest wide and of this invasive plants are known to occur on 247 acres. When looking only at pileated woodpecker habitat within MA 13 old growth areas (e.g. DOG’s and ROG’s), suitable habitat exists on approximately 87,880 acres and of this, approximately 78 acres are known to contain invasive plants.

Pine Marten

Pine (American) marten have a wide distribution across the western and eastern portions of the Blue Mountains and are year-round residents of the Blue Mountains (Mellen-McLean 2012b). Pine marten are associated with late-seral coniferous forest characterized by closed canopies, large trees, and abundant standing and downed woody material. Of particular importance is the quantity of downed debris on the forest floor as it provides protection from predators, access to the under snow environment for hunting and resting, and thermal protection from heat and cold (Ruggiero et al. 1994). Marten also show a strong preference for riparian habitat and landscapes that containing large, well connected patches of mid to later seral forest are more likely to sustain higher numbers of marten.

They eat a variety of small mammals, particularly squirrels, as well as voles, mice, pika, and rabbits and do not tolerate concentrated human use or habitat modification (Maser et al. 1981).

The historical and current density and distribution of pine marten on the MNF is unknown, but they are thought occur in low numbers. Suitable pine marten habitat occurs on 314,134 acres across the project area and includes primary habitat or multi-structure forest greater than 20 inches d.b.h., as well as secondary habitat, or multi-structure forest between 15 inches and 20 inches d.b.h. Of the total habitat, 355 acres currently have invasive plants. Approximately 15,523 acres of old growth system lands (DOGs and RPGs) within the project area are managed for pine marten and invasive plants are known to occur on approximately 18 acres within these habitats. Invasive plants do not pose a direct threat to this species or its habitat.

Three-toed Woodpecker

The tree-toed woodpecker is an indicator for lodgepole pine and mixed conifer forests. Primary habitat includes higher elevation lodgepole pine, fir/hemlock and Douglas-fir mixed (Marshall et al 2003). They are associated with mature and overmature stands with elevated levels of dead and dying wood associated with insect and disease related mortality or stand replacing wildfire (Wisdom et al 2000). They are locally abundant in areas of insect outbreaks and their populations are irruptive as they follow outbreaks across the landscape. When available post fire habitat is preferred, although numbers of nests decrease between three and five years post fire. They specialize on bark beetles (Scolytidae) versus the black-backed woodpecker which specializes on wood boring beetles (Cerambycidae) (Leonard 2001).

Potentially suitable habitat was identified by taking stands with a higher density of snags greater than 10 inches d.b.h. of preferred nesting and foraging cover types (Mellon-Mcleanon 2012c) and recent post-fire habitat. Approximately 360,000 acres of suitable habitat exists and of this, invasive plants occur on approximately 428 acres. No invasive plants have been mapped within the 631 acres of old growth habitat managed for this species. Invasive plants do not pose a direct threat to this species.

Primary Cavity Nesters (Snags and Dead Wood)

Primary cavity excavators include: Lewis' woodpecker, yellow-bellied sapsucker, red-breasted sapsucker, Williamson's sapsucker, downy woodpecker, hairy woodpecker, white-headed woodpecker, three-toed woodpecker, black-backed woodpecker pileated woodpecker and northern flicker. Table 10 identifies preferred habitat for those species not discussed above as MIS or sensitive species and a discussion of suitable habitat for these species is provided below. Collectively these species utilize a variety of habitats, although they all depend upon dead trees and down logs for reproduction and/or foraging.

Because primary cavity nesting species utilize a wide variety of snag species and size classes, virtually all forested land provides potentially suitable habitat. Although native plant infestations occur within sites containing snags, because invasive plants don't affect standing dead or downed wood habitat, they are not adversely affecting cavity nesting species or their habitat.

Table 10: Primary Cavity Nesting MIS not discussed previously

MIS Species	Habitat
Red-naped Sapsucker	Riparian habitat, especially aspen, cottonwoods and pine forest communities.
Red-breasted Sapsucker	Mature moist coniferous and mixed deciduous-coniferous forest. Typically nest in large trees.
Williamson's Sapsucker	Open, late successional lower montane forests (Douglas fir, western larch, grand fir, white fir and ponderosa pine) and aspen and cottonwood stands with high densities of snags.
Downy Woodpecker	Riparian habitat and lowland deciduous forest at low to mid elevations consisting of a mixture of grasses, shrubs and hardwoods.
Hairy Woodpecker	Ponderosa pine forest at low to mid elevations with trees 10 to 20 inches in diameter.
Black-backed Woodpecker	Post fire habitat and forest with insect and disease related mortality. Associated with high densities of smaller diameter snags (9 to 15 inches d.b.h.
Northern Flicker	Habitat generalist that prefers open areas such as open woodlands, meadows, fields and regeneration sites. Nests in large snags.

Red-naped and Red-breasted Sapsucker

Source habitat for the red-naped sapsucker consists of riparian habitats, especially aspen, cottonwoods, alder and pine, although habitat is less abundant in mixed conifer forest (Marshall et al 2003, Wahl et al 2005). Nest trees are most common aspen with heart rot, but ponderosa pine are also selected. Red-naped sapsuckers are considered common within suitable habitat across the MNF.

Williamson's Sapsucker

In northeastern Oregon, this species occurs in mature and old growth mixed conifer forests at approximately 3,500 to 6.500 ft. in elevation. Preferred habitat is comprised of open, later seral stages of montane and lower montane forest (Douglas fir, western larch, grand/white fir, ponderosa pine, aspen and cottonwood) (Wisdom et al 2000, Wahl et al 2005, Marshall et al 2003). Both live and dead trees are used for nesting, although snags are a critical component of breeding habitat (Bull et al. 1980). Williamson's sapsuckers feed at sapwells in ponderosa pine and Douglas-fir and glean insects from the bark of trunks and limbs (Marshall et al 2003). Home range size is estimated at 10 to 22 acres (Johnson and O'Neil 2001). Williamson's sapsuckers are fairly common across the Forest.

Downy Woodpecker

In Oregon the downy woodpecker is widely distributed in low to moderate elevation habitat deciduous riparian woodlands and lowland deciduous forest (Marshall et al 2003). These woodpeckers are also found in parks and orchards. Territory size ranges from five to nine acres and nesting occurs in trees and snags greater than eight inches d.b.h. Downy woodpeckers have been documented across the forest.

Hairy Woodpecker

Habitat for this species includes dry and wet coniferous forest at low to mid-elevations, as well as deciduous forest and riparian areas. The hairy woodpecker uses all ages of forest, although older stands are often preferred for nesting. Nesting occurs in moderately decayed snags, primarily in ponderosa pine trees between 10 and 20 inches d.b.h. Highest densities occur in un-salvaged forests and recent (one to five years) post-fire habitat with moderate to high densities of snags. Older burns do no support high levels of wood-boring beetles used for foraging (Saab et al 2007). Home range size has been reported at between 22 and 37 acres (Marshall et al 2003). This species is frequently detected at point count surveys across the Forest.

Black-backed Woodpecker

This species is largely restricted to post fire habitat (Saab and Dudley 1998). In the Blue Mountains it is associated with high elevation boreal and montane coniferous forest, especially recent (less than five years) post-fire habitat (Dixon and Saab 2000). However it is occasionally observed in mixed conifer, lodgepole pine, Douglas fir, and spruce fir forests (Hutto 1995). Observations of this species on the Forest occur primarily in areas of large stand replacing wildfires.

Northern Flicker

The northern flicker is a common resident woodpecker in Oregon. It is a habitat generalist, although is most abundant in open forests and forest edges. This species utilizes coniferous and deciduous forest, riparian woodlands and urban areas (Marshall et al 2003, Wahl et al 2005). Nesting typically occurs in open areas with snags that exhibit some decay. Marshall et al (2003) found that 71 percent of the nest trees had broken tops. Northern flickers are detected on a fairly regular basis during breeding bird surveys across the MNF, particularly in post-fire habitat.

Project Area Information

Because primary cavity nesting species utilize a wide variety of snag species and size classes, virtually all of the forested land provides potentially suitable habitat. Although native plant infestations occur within sites containing snags, because invasive plants don’t affect standing dead or downed wood habitat, they are not adversely affecting cavity nesting species or their habitat.

Featured Species

Featured species identified in the Malheur Forest Plan include species that require special protection. These species and their preferred habitat are displayed in table 11. Some of these species have already been discussed and narrative affected environment discussion is not repeated here.

Table 11: Featured Species

Featured Species	Habitat
Northern Goshawk	Mature mixed conifer forest with predominantly closed canopy conditions for nesting and a diversity of forest and non-forest conditions for foraging
Blue Grouse	Coniferous forests (Douglas-fir, grand fir, subalpine fir) with a mixture of deciduous trees and shrubs near edges and clumps, and mistletoe infected Douglas-fir located on ridge tops or upper slope positions
Sage Grouse	See Sensitive Species Section.
Osprey	Large, old trees with dead tops or large snags suitable for nesting adjacent to large rivers or lakes.
Pronghorn Antelope	Open grasslands with low sagebrush being an important component.
California Bighorn Sheep	Alpine desert grasslands associated with mountains, cliffs, foothills and river canyons.
Upland Sandpiper	See Sensitive Species Section.

Northern Goshawk

The northern goshawk can be found in landscapes that contain large blocks of mature forest, large trees for nesting and abundant prey (squirrels, grouse, hares, larger songbirds). They use broad landscapes that incorporate multiple spatial scales including more closed canopy stands for nesting and foraging and post-fledging habitat areas (PFA). Nest stands are typically composed of large trees, closed canopies and multiple canopy layers (McGrath et al. 2003, Reynolds et al 1992), whereas PFAs typically include a variety of forest types and conditions, including young forest and openings (Reynolds et al. 1992). Goshawks are classified as prey generalists (Squires and Reynolds 1997) and forage for small birds and mammals in open understories below the MNF canopy and along small forest openings (Reynolds et al 1992). Foraging areas are usually more open than nesting areas, but would contain large trees, snags, down logs, vegetative layering, and other structural elements important to prey species (Reynolds et al. 1992).

There are 142 goshawk nests and associated PFAs across the MNF. Nesting and foraging habitat occurs on approximately 400,700 acres and invasive plants have been mapped within about 567 acres of these habitats. Post fledgling areas cover approximately 27,000 acres and invasive plants have been mapped within 18 acres of this habitat. Because of its preference for closed canopy forest, invasive plants are not considered a direct threat to the goshawk.

Blue (Dusky) Grouse

Blue grouse prefer coniferous forest (Douglas fir, grand fir and sub-alpine fir) with a mixture of deciduous trees and shrubs near edges and openings and feed and nest in a variety of forest and shrub vegetation types. They utilize large, mistletoe infected Douglas fir trees, generally located within the upper third of slopes as winter roosts, whereas dense coniferous thickets of small trees, stumps, and down logs are used by blue grouse for resting, drumming and escape cover. They also utilize dense deciduous areas in riparian corridors. Blue grouse home ranges are typically 1.25 to 5 acres, and are usually associated with openings and rocky areas. The food items of blue grouse vary from a simple winter diet of primarily coniferous needles to a summer diet consisting of a variety of green leaves, fruits, seeds, flowers, animal matter and conifer needles. While vegetation makes up over 90 percent of their diet, young birds feed almost exclusively in insects (Schroeder 1984).

Blue grouse occur across the MNF, whereas winter roost habitat occurs on approximately 6,800 acres. Invasive plants do not pose a direct threat to this species. Invasive plants have been mapped on approximately 1,870 acres of suitable coniferous forest habitat. One acre of invasive plants have been mapped within winter roost habitat. Invasive plants are not considered a direct threat to blue grouse.

Bighorn Sheep

Bighorn sheep generally inhabit open areas of rocky slopes, ridges, rim rocks, cliffs, and canyon walls with adjacent grasslands or meadows, and few trees (Verts and Carraway 1998). Dense forest communities are avoided. Their primary diet consists of bunchgrass, but also includes significant amounts of forbs and shrubs during the growing seasons. In the spring they will also utilize cheatgrass, which is an invasive annual plant. Most bighorn sheep use forage areas mainly within one-half mile but up to one mile of escape terrain. Both summer and winter range must provide freedom from disturbance and a proper juxtaposition of forage, escape terrain, and water.

California bighorn sheep were introduced into the Strawberry Mountain Wilderness and near Aldrich Mountain. Excellent summer range and adequate quality winter range have contributed to an expanding or stable population. The Aldrich Mountain herd unit, totals 69,060 acres and contains 13 acres of known invasive plants, whereas less than an acre is known to occur in the 58,688 acres Strawberry Mountain unit. Based on known infestations, invasive plants are not currently impacting bighorn sheep or their habitat.

Sage Grouse

Discussed as a Forest Sensitive Species.

Osprey

Osprey are highly migratory raptors that typically breed and nest along larger rivers, lakes and reservoirs. Osprey feed almost exclusively on fish and documented nests in Oregon are almost always located close to water with adequate fish populations. Osprey have been documented on the MNF and suitable nesting and foraging habitat exists along rivers and lakes across the MNF. Currently, 67 acres of invasive plants are mapped within 300 feet of waterbodies or rivers that may be used for nesting or foraging. Invasive plants are not a direct threat to osprey.

Pronghorn Antelope

In Oregon habitat includes sagebrush steppe, as well as areas occupied by widely spaced juniper or ponderosa pine. For most of the year water is essential and animals are seldom found far from available sources, with most herds within 2.5 and 5 miles of water. In spring and summer, broad leaved herbaceous vegetation is the preferred food, although pronghorn will browse on tips of sagebrush in winter and occasionally eat some grasses. Common food plants include longleaf phlox, wallflower and balsamroot. Pronghorn are fairly common in the open valley areas on the MNF and adjoining private, state and federal lands. Populations appear to be increasing slightly.

Approximately 78,000 acres of pronghorn habitat within the project area occur adjacent to larger blocks of habitat on other land ownerships. Approximately 122 acres of invasive plants are mapped within this habitat. Invasive grasses can reduce habitat for local populations of antelope (California Department of Fish and Game 2013).

Upland Sandpiper

Discussed as a Forest Sensitive Species.

Birds of Conservation Concern

Birds of Conservation include species identified in the Partner In Flight (PIF) conservation strategy (Altman 2000, Altman and Holmes 2000), U.S. Fish and Wildlife Service birds of conservation concern (USDI FWS 2008) and gamebirds below desired condition (GBBDC (USDI FWS 2013c). Collectively, these species are evaluated to ensure that migratory bird habitat is maintained and that proposed actions are consistent with the migratory bird treaty act and Executive Order 13186. These species and their associated habitats are displayed in the following tables.

Landbirds

Landbirds evaluated in this analysis include focal species associated with priority or unique habitats identified in the Partner In Flight (PIF) Conservation Strategy for Landbirds of the Northern Rocky Mountains of Eastern Oregon and Washington (Altman 2000), and those identified in the PIF Conservation Strategy for the Columbia Plateau of Eastern Oregon and Washington (Altman and Holmes 2000). These focal species and their habitat are displayed in tables 12 and 13.

Table 12: Northern Rocky Mountain Habitat Types – Landbird Focal Species and Their Habitats

Habitat	Habitat Feature	Focal Species
Priority Habitats		
Dry Forests	Large patches of old forest with large trees/snags	White-headed Woodpecker[1]
	Old Forest with grassy openings an dense thickets	Flammulated Owl
	Open understory with regenerating pines	Chipping Sparrow
	Patches of burned old forest	Lewis' Woodpecker[1]
Mesic Mixed Conifer (Late Successional	Large Snags	Vaux's Swift
	Overstory canopy closure	Townsend's Warbler
	Structurally diverse, multi-layered	Varied Thrush
	Dense shrub layer in forest openings or understory	MacGillivray's Warbler
	Edges and openings created by wildfire	Olive-sided Flycatcher
Riparian Woodland	Large Snags	Lewis' Woodpecker[1]
	Canopy foliage and structure	Red-eyed Vireo
	Understory foliage and structure	Veery
Riparian Shrub	Willow/alder shrub patches	Willow Flycatcher
Unique Habitats		
Sub-alpine Meadows		Hermit Thrush
Montane Meadows (wet/dry)		Upland Sandpiper[1]
Steppe Shrublands		Vesper Sparrow
Aspen		Red-naped Sapsucker
Alpine		Gray-crowned Rosy Finch

1 – Also evaluated as an MIS or featured species

Table 13: Columbia Plateau Habitat Types – Landbird Focal Species and Their Habitats

Habitat	Habitat Feature	Focal Species
Priority Habitats		
Steppe-Grassland	Native bunchgrass cover	Grasshopper Sparrow[1]
Steppe-Shrubland	Interspersion of tall shrubs and openings	Loggerhead Shrike
	Burrows	Burrowing Owl
	Deciduous trees and shrubs	Sharp-tailed Grouse
Sagebrush	Large areas with diverse understory	Sage Grouse[1]
	Large contiguous patches	Sage Sparrow
	Sagebrush cover	Brewer' Sparrow
	Sagebrush height	Sage Thrasher
Shrublands	Ecotonal edges of herb, shrub and tree habitat	Lark Sparrow
	Upland sparsely vegetated desert shrub	Black-throated Sparrow (BR and OW only)
Juniper-Sage Steppe	Scattered mature juniper trees (savannah)	Ferruginous Hawk
Riparian Woodland	Large snags (cottonwood)	Lewis' Woodpecker[1]
	Large canopy trees	Bullock's Oriole
	Subcanopy foliage	Yellow Warbler
	Dense shrub layer	Yellow-breasted Chat
	Large structurally diverse patches	Yellow-billed Cuckoo[1]
Riparian Shrub	Dense shrub patches	Willow Flycatcher
	Shrub-herbaceous interspersion	Lazuli Bunting
Unique Habitats		
Aspen	Large trees and snags with regeneration	Red-naped Sapsucker
Agricultural Fields	Mesic Conditions	Bobolink
Cliffs and Rimrock	Undeveloped foraging areas	Prairie Falcon
Juniper Woodland	Mature trees with regeneration	Gray Flycatcher
Mountain Mahogany	Large diameter trees with regeneration.	Virginia' Warbler

1 – Also evaluated as an MIS, federally proposed, sensitive or featured species

Conservation Recommendations

The following are conservation recommendations for the Northern Rocky Mountains (Altman 2000) and the Columbia Plateau (Altman and Holmes 2000) that relate to invasive plants or their management.

Columbia Plateau (Altman and Holmes 2000)

Conservation Strategies for Shrub-Steppe

<u>Insecticides/Herbicides</u>: use of insecticides can reduce the insect food base for many bird species. Use of herbicides can reduce cover and indirectly affect the insect food base.

- Minimize or discontinue use of pesticides wherever possible.
- Practice procedures in Integrated Pest Management for reduced destruction of non-target insects.
- Encourage biological controls rather than herbicide controls wherever possible.
- Treatments should be followed by restoration activities.
- Limit the application of herbicides to invasive non-native species, and use in conjunction with habitat enhancement projects which include long-term solutions to control future infestations.

Conservation Strategies for Steppe

- Grasshopper Sparrow: Where treatments are occurring in grasslands (e.g. burning, mowing, herbicide applications) leave adjacent untreated areas to maintain a population of associated birds until treated areas become suitable.
- Loggerhead Shrike: Avoid insecticide spraying during the breeding season in shrike nesting habitat.

Conservation Strategies for Shrublands

- Lark Sparrow: Use exotic weed control and replant with native perennials to restore degraded habitat.

Conservation Strategies for Riparian

Pesticides/Herbicides: Use of insecticides can reduce the insect food base for many bird species. Use of herbicides can reduce cover and indirectly affect the insect food base.

- Use Integrated Pest Management practices or non-spraying in low human use areas (e.g., mosquito spraying).
- Encourage biological controls rather than herbicide controls wherever possible.
- Applications should be done by hand if practical to target appropriate species (e.g. noxious weeds).
- Applications on lands adjacent to riparian areas should avoid environmental conditions where the riparian zone may be threatened.
- Limit the application of fertilizers, pesticides, and herbicides in the riparian zone to invasive non-native species (e.g. reed canary grass) in conjunction with habitat enhancement projects which include long-term solutions such as planting trees and shrubs to eventually shade-out future infestations.

Lewis' Woodpecker: Eliminate or minimize pesticide spraying within territories of nesting pairs, which may reduce insect prey base.

Bullock's oriole: Use mechanical or other means to remove invasive plants in the understory that inhibit growth and development of young (recruitment) trees.

Yellow Warbler: Eliminate willow cutting and herbicide spraying in riparian zone (Taylor and Littlefield 1986).

Yellow-breasted Chat: Eliminate willow cutting and herbicide spraying in riparian zone.

Willow Flycatcher and Lazuli Bunting: Eliminate willow cutting and herbicide spraying in riparian zone.

Where herbicide control of riparian exotic shrubs and trees (e.g. Russian olive) is occurring within known nesting habitat, consider the following actions:

- Conduct treatment outside the breeding season.
- Treat patches on a staggered rotation to allow some habitat to remain for breeding; treat remaining patches when treated patches approach habitat suitability.
- Let treated areas decompose naturally without mechanical assistance to maintain structure and allow for continued use.
- Use mechanical removal in smaller areas of treated patches to assist in recolonization by desired species through planting/seedlings.

Conservation Strategies for Unique Habitats
Prairie falcon: Agricultural pesticide use may be adversely affecting prey populations. Habitat alteration in foraging areas may affect prey base.

Northern Rocky Mountains (Altman 2000b)

Conservation Strategies for Dry Forest
Pesticides/Herbicides: Use of insecticides can reduce the insect food base for many bird species. Use of herbicides can reduce cover and indirectly affect the insect food base.

- Use Integrated Pest Management practices or non-spraying in low human use areas (e.g., mosquito spraying).
- Encourage biological controls rather than herbicide controls wherever possible.
- Applications should be done by hand if practical to target appropriate species (e.g. noxious weeds).
- Applications on lands adjacent to riparian areas should avoid environmental conditions where the riparian zone may be threatened.

Flammulated Owl: Avoid insect control spraying near known nest areas or suitable habitat.

Lewis' Woodpecker: Eliminate or minimize pesticide spraying within territories of nesting pairs, which may reduce insect prey base.

Conservation Strategies for Mesic Mixed Conifer
Pesticides/Herbicides: Use of insecticides can reduce the insect food base for many bird species. Use of herbicides can reduce cover and indirectly affect the insect food base.

- Use Integrated Pest Management practices or non-spraying in low human use areas (e.g., mosquito spraying).
- Encourage biological controls rather than herbicide controls wherever possible.
- Applications should be done by hand if practical to target appropriate species (e.g. noxious weeds).
- Applications on lands adjacent to riparian areas should avoid environmental conditions where the riparian zone may be threatened.

Vaux's Swifts: Avoid use of pesticides near retained snags.

Conservation Strategies for Riparian

Pesticides/Herbicides: Use of insecticides can reduce the insect food base for many bird species. Use of herbicides can reduce cover and indirectly affect the insect food base.

- Use Integrated Pest Management practices or non-spraying in low human use areas (e.g., mosquito spraying).
- Encourage biological controls rather than herbicide controls wherever possible.
- Applications should be done by hand if practical to target appropriate species (e.g. noxious weeds).
- Applications on lands adjacent to riparian areas should avoid environmental conditions where the riparian zone may be threatened.
- Limit the application of fertilizers, pesticides, and herbicides in the riparian zone to invasive non-native species (e.g. reed canary grass) in conjunction with habitat enhancement projects which include long-term solutions such as planting trees and shrubs to eventually shade-out future infestations.

Lewis' Woodpecker: Eliminate or minimize pesticide spraying within territories of nesting pairs, which may reduce insect prey base.

Veery: Eliminate willow cutting and herbicide spraying in riparian zone.

Willow Flycatcher: Eliminate willow cutting and herbicide spraying in riparian zone.

Where herbicide control of riparian exotic shrubs and trees (e.g. Russian olive) is occurring within known nesting habitat, consider the following actions:

- Conduct treatment outside the breeding season.
- Treat patches on a staggered rotation to allow some habitat to remain for breeding; treat remaining patches when treated patches approach habitat suitability.
- Let treated areas decompose naturally without mechanical assistance to maintain structure and allow for continued use.
- Use mechanical removal in smaller areas of treated patches to assist in recolonization by desired species through planting/seedlings.

National Birds of Conservation Concern

In an effort to conserve bird species of concern and comply with the Migratory Bird Treaty Act, the United States Fish and Wildlife Service developed a nationwide Birds of Conservation Concern (BCC) list in 2002. This BBC list was updated in 2008 (USFWS-2008) and identifies species, sub-species, and populations of migratory and non-migratory birds in need of additional conservation action. These species are deemed to be the highest priority for conservation actions and would be considered prior to taking management actions. Bird Conservation Regions (BCRs) were developed based on similar geographic parameters and each BCR identifies species of concern. The project area includes BCR 10, (Northern Rockies) and table 14 displays national birds of conservation concern.

Table 14: National Birds of Conservation Concern

Bird Species	Preferred Habitat
Bald Eagle[1]	Forest with Large Trees Near Open Water
Swainson's Hawk	Elevated Nest Sites In Open Country
Ferruginous Hawk	Elevated Nest Sites In Open Country
Peregrine Falcons[1]	Cliffs, Wide Range Of Habitats
Upland Sandpipers[1]	Grasslands
Long-Billed Curlew	Grasslands
Yellow-Billed Cuckoos	Dense Riparian Cottonwoods
Flammulated Owl	Open Ponderosa Pine Forests
Black Swift	Cliffs Associated With Waterfalls For Nesting, Forage In Forest and Open Areas
Calliope Hummingbird	Open Forest And Shrubs At Higher Elevations And Riparian Areas.
Lewis's Woodpeckers[1]	Mature Open Forest With Large Snags
Williamson's Sapsucker[1]	Coniferous Forest and Aspen With Snags
White-Headed Woodpeckers[1]	Old Open Forest With Large Snags.
Olive-Sided Flycatcher	Edges And Openings Within Forest
Willow Flycatcher	Dense Shrub Patches
Loggerhead Shrike	Grasslands, Open Woodlands, Juniper/Sage
Sage Thrasher	Large Patches Of Sagebrush
Brewer's Sparrow	Dense Sagebrush
Sage Sparrow	Large Patches Of Sagebrush
McCown's Longspur	Sparse Grasslands
Black Rosy-Finch	Above Timberline In Bare Rock, Cirques, Cliffs
Cassin's Finch	Open Mature Coniferous Forest

1 – Also evaluated as an MIS, federally proposed, sensitive or featured species

Gamebirds Below Desired Condition (GBBDC)

This list includes species whose populations are below long-term averages or management goals, or for which there is evidence of declining population trends (USDI Fish and Wildlife Service 2013c). Table 15 displays GBBDC species that may occur within the project area (Cornell Lab of Ornithology 2013), feeding strategies and preferred habitat.

Table 15: Gamebirds below desired condition

Species	Habitat
Canvasback	Wetlands, ponds and lakes (plants and aquatic insects)
Mourning Dove	Open forest and woodlands (seeds)
Ring-necked Duck	Marshes and ponds, open water wetlands. (plants and aquatic invertebrates)
Wood Duck	Swamps, ponds and wetlands with snags (insects, seeds and fruit, acorns)
Mallard	Wetlands, ponds and lakes, roadside ditches (aquatic plants and insects)
Northern Pintail	Open country with shallow wetlands (insects and seeds)
Redhead	Lakes and ponds (plants)
Lesser Scaup	Lakes and ponds feeds on insects (aquatic insects and plants)
American Wigeon	Wetlands, ponds, marshes and rivers (aquatic insects and plants)

Pollinators

A reduction or shift in pollinator species could lead to changes in plant species composition or diversity (USDA Forest Service 2005a, 4-27). Native pollinators have co-evolved with the plants they visit, such that their physiology is matched to most efficiently exploit the nectar and pollen resources of the flowers upon which they specialize. It is highly likely that reduced species diversity from invasive plants has indirect negative effects on pollinators.

Many invasive plants are early successional species, meaning they colonize areas that have been recently disturbed. Since invasive plants have the ability to deplete available resources to lower levels than native vegetation can tolerate, they can quickly dominate disturbed sites and displace native vegetation. When invasive plants dominate native plant communities, native plant species diversity is decreased. The North American Pollinator Protection Campaign (2006) determined that invasive plants, left untreated, shift species composition and affect pollinated plants by disrupting the structure and function of ecosystems.

Colony Collapse Disorder

Pesticides are one of several factors thought to possibly contribute to catastrophic losses of honey bees, known as “colony collapse disorder” or CCD, reported since 2006. Thus, a discussion of the possible connection of herbicide use proposed for the action alternatives and CCD is warranted.

The European honey bee (*Apis mellifera*) is not native to the American continents, but was introduced by European settlers in the 1600s. It is widely distributed and commercially produced in the U.S. with escaped feral colonies formerly present across most of the country (parasitic mites have destroyed most of the feral honey bees across the United States (CCD Steering Committee 2007). The honey bee is used to pollinate agricultural crops and produce honey. The honey bee adds about $15 billion in value to agricultural crops each year (Morse and Calderone 2000).

In 2006-2007, commercial honey bees in North America, and other parts of the world, experienced alarming declines characterized by the disappearance of adult bees from the hives with no or few dead bees near the hive; healthy, capped brood; food reserves that have not been robbed; minimal evidence of wax moth or hive beetle damage; and a laying queen with immature bees and newly emerged attendants (CCD Steering Committee 2007, Winfree et al. 2007). This phenomenon has been termed “colony collapse disorder.” By 2007, almost 30 percent of beekeepers in the U.S. reported losses of up to 90 percent of their colonies (Cox-Foster et al. 2007; Winfree et al. 2007). CCD has not been reported in wild native bees (Winfree et al. 2007).

Suspected causes of CCD include the following factors, alone or in combination: 1) environmental and nutritional stress; 2) new and/or re-emerging pathogens; 3) pests that attack bees; and 4) pesticides (CCD Steering Committee 2007). Several major setbacks to honey bee populations over the last two decades have combined to increase stress on the remaining hives, as they are moved and worked for their pollination services over longer seasons and larger geographic areas. Climate change, drought, and unseasonably cold weather combine to create increased stress on bee populations. Commercial bees are often fed high fructose corn syrup, which may contribute to some nutritional deficiencies. Nutritional deficiencies are thought to make the bees more susceptible to attack from pathogen and anecdotal evidence indicates that hives that are fed nutritional supplements over the winter are more resistant to CCD (Anonymous 2009).

Pathogens are primary suspect because CCD is transmissible to other hives through the reuse of equipment from CCD-affected colonies, and such transmission can be broken by irradiation of the equipment before use (Pettis et al. 2007). A recent paper using current gene technology has indicated that Israeli acute paralysis virus is strongly correlated with CCD and is a current leading candidate for its cause, alone or in combination with other factors (Cox-Foster et al. 2007, Kaplan 2008). Another recent paper implicates an infection from the parasite *Nosema ceranae,* but losses from CCD in hives treated for this parasite may differ between European and American hives (Higes et al. 2009, Goodman 2009).

Pests including the varroa mite, small hive beetle, wax moth, and others stress bees and may harbor infectious agents. In particular, the varroa mite has been responsible for catastrophic losses of 50 to 100 percent in many beekeeping operations and has eliminated most feral bee colonies. In addition, the varroa mite is known to carry pathogens transmitted to bees and is thought to suppress the immunity of honey bees (Shen et al. 2005).

Pesticide exposure may affect bees through direct toxicity or by adding additional stress. Beekeepers treat hives with miticides and fungicides and bees may be exposed to pesticides while foraging on agricultural crops. Currently, the classes of pesticides thought to be the most likely contributors to, and being researched for correlation with CCD include insecticides, miticides, and fungicides (CCD Steering Committee 2007). Recent research has found higher-than-expected levels of miticides and traces of a wide variety of agricultural chemicals in bee hives, but no consistent pattern in levels or types of chemicals identified (Kaplan 2008).

Environmental Consequences

This section evaluates effects to wildlife and wildlife habitat and includes an analysis for each of the alternatives considered as well as an evaluation of effects to threatened and endangered, regionally sensitive, management indicator species, featured species and birds of conservation concern.

Alternative Effects

Effects of Alternative A (No Action)

Under Alternative A, no invasive plant treatments and therefore no direct or indirect treatment related effects would occur. While current levels of invasive plant control may occur on adjacent lands, invasive plants would continue to be introduced, established or spread within the project area at the rate of approximately eight to twelve percent per year (R6 2005 FEIS); a rate assumed to be reduced by half due to increased emphasis on consistently applied prevention measures since 2005 (R6 2005 ROD). Native plants and habitats would continue to be threatened by invasive plants. Effects on wildlife would vary. For closed canopy forested species (e.g. goshawk) or species that are not affected by invasive plants such as woodpeckers or bats, or species that occupy habitat away from invasive plant vectors (e.g. Wallowa rosy finch), there would be little effect to these species or their habitat.

Due to their proximity to invasive plant vectors and more open canopy conditions, habitats such as grassland/meadows, sagebrush, open-canopied forest (e.g. savannah) and many wetland/riparian areas would continue to be affected by invasive plants. Effects to wildlife dependent on these communities would be a reduction in cover or forage as native habitat is replaced by non-natives. Infestations that become so well established that future treatment is cost-prohibitive could result in permanent loss of habitat (Asher 2000). For example, habitat loss via invasive plant infestation has been reported to occur in Oregon spotted frog habitat that is invaded by reed canary grass (Hayes 1997). Sage grouse and pygmy rabbits could be displaced if invasive plants expand into native rangeland (Connelly et al. 2000, Weiss and Verts 1984) and foraging habitat for elk and other big game could decrease (Rice et al. 1997). The spread of invasive wetland plants can also reduce waterfowl nesting habitat (Utah Division of Wildlife Resources 2009).

Consequently under Alternative A, the long-term loss of native vegetation and habitat due to continued encroachment of invasive plants would adversely affect species such as elk, antelope, grasshopper sparrow, greater sage grouse, upland sandpiper, bobolink, Columbia spotted frog, silver-bordered fritillary and several migratory birds of concern.

Effects Common to all Action Alternatives

This section discusses general effects on wildlife that are common to all action alternatives and is based on effects of invasive plant treatments to wildlife that are evaluated in detail in the R6 2005 FEIS, the corresponding Biological Assessment (USDA Forest Service 2005c), project files, and SERA risk assessments.

General Effects of Treatment

All treatment methods have the potential to disturb, temporarily displace, or directly harm various wildlife species. Conversely, successful control of invasive plant infestations provides long-term benefits to wildlife, by restoring native habitats. Potential adverse effects to wildlife are determined largely by the potential for exposure to treatment. Because most invasive species are shade intolerant, the majority of treatments would occur in openings, early seral habitat, or in forested habitat with a relatively open canopy. Consequently, species that occur primarily in closed canopy forests are less likely to be affected by proposed treatments. Conversely, species that prefer or require relatively open habitats are more likely to be adversely affected by both invasive plant infestations and treatment.

The effects of treatments on wildlife are relative to the size and locations of existing and future invasive plant infestations, the type of treatment used, and the timing and duration of the treatments. Treatment of infestations along disturbed roadsides are not likely to substantially affect terrestrial wildlife populations, since this vegetation type does not provide essential habitat for native wildlife species, and it consists of long, narrow areas spread over large distances. Treatment of large infested areas may create more disturbances for longer periods than treatment of small infestations. Treatment of dense infestations can create bare ground, which may reduce cover and expose certain species to increased predation, although few known sites contain greater than 50 percent infestation.

For the most part, invasive plant treatments would not alter native habitat structure or composition for terrestrial wildlife species. Most of the invasive plants on the MNFs are forbs, thus woody species, and shrubs and trees would not likely be affected by treatments. Impacts to non-target forbs and grasses would generally be minor and occur within treated areas or within short distances of treated areas (less than 100 feet for broadcasting, 15 feet for spot treatment). In some cases, removal of invasive plants could cause a localized decrease in the amount of vegetative cover provided but due to the patchy nature of invasive plant infestations, there would likely be little cover lost. Unlike other management activities (i.e. timber harvest), invasive plant treatments are not likely to reduce available habitat or prey availability.

Manual and Mechanical Treatments

Disturbance from manual and mechanical treatments is likely to pose greater risks to terrestrial wildlife species than herbicide or cultural methods (USDA FS 2005e). Small species that lack rapid mobility (e.g. amphibians, mollusks) and ground nesting birds are vulnerable to crushing or injury from people or equipment. Manual treatments can take longer to implement than other methods, increasing the length of time of disturbance. Manual treatments are often used at small sites, where the potential to impact wildlife would be minimal, but may also be used in large areas with scattered invasive plants. In these situations, crews of 3-5 people may be in an area for more than a day. Bare ground is likely to be patchy in distribution with this method and less likely to interfere with animal movement or dispersal. Mechanical methods can generate more noise disturbance than other methods. Hand held mechanical equipment like chainsaws and trimmers can be used very selectively on target plants and may be less likely than larger equipment to harm wildlife. Use of vehicle mounted equipment, like mowers, is less selective and more likely to directly impact small animals than use of hand operated equipment, such as string trimmers.

Biological Control

Biological control is proposed on sites that are either too large to be sprayed with herbicides, where invasive plant species are so abundant that other methods would not be practical, or where the biological control agent is effective on the target plant species and treatment can reduce or eliminate the need for herbicides.

Biological control will not directly affect native wildlife species; however, recent studies have found that native rodents may take advantage of the food source provided by biological control agents. Effects include short-term disturbance similar to that described under manual treatment during release. Although some bio control agents available have adverse effects to non-target wildlife, only APHIS and State-approved biological control agents would be used. Also agents demonstrated to have direct negative impacts on non-target organisms would not be released. As a result there are no adverse effects to wildlife anticipated under any action alternative.

Due to the maintenance of native vegetation and habitat, indirect effects of biological control include reducing invasive plant populations and providing a supplemental food source, both of which can have long-term benefits to wildlife.

Cultural/Restoration

Restoration or reclamation of sites infested with invasive plants follow treatment restoration standard 13 (USDA FS 2005b) and incorporate guidelines for re-vegetation of invasive plant sites and other disturbed areas on National Forests and Grasslands in the Pacific Northwest (Erickson et al. 2003). On degraded sites where reproducing individuals of desirable species are absent or in low abundance, re-vegetation with well adapted and native competitive grasses, forbs and legumes can be used to direct and accelerate plant community recovery, reduce erosion, and restore native wildlife habitat conditions. Restoration treatments proposed under the action alternatives include mulching, seeding and planting. Effects of cultural treatments to wildlife are similar to those described under manual treatments and include short-term avoidance of the site during treatment. Due to the small amount of treatment proposed, scattered nature of proposed sites, widespread availability of unaffected habitat, and with implementation of pdfs to protect species of conservation concern, effects to wildlife would be limited to short-term disturbance during treatment.

Herbicide Effects to Wildlife

Results of numerous field studies indicate the likelihood for direct adverse effects to wildlife from herbicide use is low (Marshall and Vandruff 2002, Dabbert et al. 1997, Fagerstone et al. 1977, Rice et al. 1997, Sullivan et al. 1998, Cole et al. 1997, Cole et al. 1998, Johnson and Hansen 1969, Nolte and Fulbright 1997, McMurry et al. 1993a, and McMurry et al. 1993b), however, use of herbicides to treat invasive plants does have the potential to harm free-ranging wildlife (USDA FS 2005b p. 1-11). Herbicides can also cause some malformation or mortality to amphibians that have been exposed to herbicides or surfactants in water (Relyea 2005).

Risk from herbicide exposure was determined using data and methods outlined in the SERA risk assessments. A quantitative estimate or dose was compared to toxicity indices (see tables 16 and 17). If a dose exceeded the toxicity index, then it was determined to have potential for an adverse effect. Quantitative estimates of dose for each animal group for each herbicide are contained in the project file worksheets. Wildlife species evaluated were placed into groups based on taxa type (e.g. bird, mammal), body size, and diet. Exposure scenarios for the various groupings were used to quantitatively estimate dose and characterize risk at both the typical and highest application rate for each herbicide/surfactant. Exposure scenario results were evaluated in terms of whether or not they exceeded the NOAEL (No Observed-Adverse Effect Level) for an acute exposure (i.e. consumed exclusively contaminated prey during a 24 hour period) or chronic exposure (i.e. consumed nothing but contaminated prey for 90 days). Tables 16 and 17 display the toxicity indices for birds and mammals used in this analysis, whereas table 18 displays exposure scenarios results. Toxicity indices represent the most sensitive endpoint from the most sensitive species for which adequate data are available. Toxicity results are discussed in more detail in Appendix P of the R6 2005 FEIS.

Table 16: Toxicity Indices for Birds

Herbicide	Duration	Endpoint	Dose mg/kg/day	Species	Effects Noted at LOAEL
Aminopyralid	Acute	NOAEL	14	Quail	Ruffled appearance at 23 mg/kg

Herbicide	Duration	Endpoint	Dose mg/kg/day	Species	Effects Noted at LOAEL
	Chronic	NOAEL	184 *	Mallard	No adverse effects to adults or offspring at highest dose tested (184 mg/kg/day)
Chlorsulfuron	Acute	NOAEL	1686	Quail	No significant effects at highest dose
	Chronic	NOAEL	140	Quail	No significant effects at highest dose
Clopyralid	Acute	NOAEL	670	Mallard & Quail	No signs of toxicity reported, LOAEL not determined
	Chronic[1]	NOAEL	15	Rat	Thickening of gastric epithelium at 150 mg/kg/day
Glyphosate	Acute	NOAEL	540	Mallard & Quail	No significant effects
	Chronic	NOAEL	43	Quail	Decreased body weight and changes in bone composition
Imazapic	Acute	NOAEL	1100	Quail	No effects at highest dose
	Chronic	NOAEL	113	Quail	Decreased weight gain in chicks at 170 mg/kg/day
Imazapyr	Acute	NOAEL	2510	Mallard & Quail	No effects at highest dose
	Chronic	NOAEL	610	Mallard & Quail	No signs of toxicity
Metsulfuron methyl	Acute	NOAEL	1043	Quail	No significant effects at highest dose
	Chronic	NOAEL	120	Mallard & Quail	No significant effects at highest dose
Picloram	Acute	NOAEL	1600	Mallard	No effects to adults. Low mortality to young at highest dose.
	Chronic[1]	NOAEL	65	Quail	Decreased body weight of chicks. LOAEL 127 mg/kg/day.
Sethoxydim	Acute	NOAEL	>500	Mallard & Quail	No or low mortality at highest doses tested. LOAEL not available.
	Chronic	LOAEL[2]	10	Mallard	Decreased number of normal hatchlings at 10 mg/kg/day
Sulfometuron methyl	Acute	NOAEL	312	Mallard	Decreased weight gain at 625 mg/kg/day
	Chronic[1]	NOAEL	2	Rat	Effects on blood and bile ducts at 20 mg/kg/day
Triclopyr	Acute	NOAEL	126	Quail	LOAEL 350 mg/kg. Incoordination, lethargy (based on gavage exposure, which is extreme and more toxic than dietary exposure)
	Chronic	NOAEL	7.5	Mallard & Quail	Reduced eggshell thickness at 15 mg/kg/day

* The chronic toxicity index is higher than the acute toxicity index because the acute value is based on a gavage study and the chronic value is based on a dietary exposure study. There are substantial differences in effects from the different dose methods. Effects from gavage dosing were rapidly reversed, but are used in the assessment of risk to be conservative. This may lead to a gross overestimate of acute risk (SERA 2007, p. 96-97).

1 Chronic toxicity studies in birds are not available, so the value from mammal studies is used.

2 Based on one study in which a NOAEL was not determined, so the LOAEL is used.

Sources: SERA 1998, 2001, 2003, 2004, 2007; 2011, Bakke 2003;

Table 17: Toxicity Indices for Mammals

Herbicide	Duration	Endpoint	Dose mg/kg/day	Species	Effect Noted at LOAEL
Aminopyralid	Acute	NOAEL	104	Rabbit	Weight loss and in coordination at 260 mg/kg
	Chronic	NOAEL	50	Rat	Cecal enlargement at 500 mg/kg/day
Chlorsulfuron	Acute	NOAEL	75	Rabbit	Decreased weight gain at 200 mg/kg
	Chronic	NOAEL	5 m	Rat	Weight changes at 25 mg/kg/day
Clopyralid	Acute	NOAEL	75	Rat	Decreased weight gain at 250 mg/kg
	Chronic	NOAEL	15	Rat	Thickening of gastric epithelium at 150 mg/kg/day
Glyphosate	Acute	NOAEL	500	Rabbit	Diarrhea at 350 mg/kg
	Chronic	NOAEL	500	Rabbit	Diarrhea at 350 mg/kg
Imazapic	Acute	NOAEL	350	Rabbit	Decreased body weight at 500 mg/kg
	Chronic	NOAEL[2]	45	Dog	Microscopic muscle effects at 137 mg/kg
Imazapyr	Acute	NOAEL	250	Dog	No effects at highest doses tested
	Chronic	NOAEL	25	Dog	No effects at highest doses tested
Metsulfuron methyl	Acute	NOAEL[3]	25	Rat	Decreased weight gain at 500 mg/kg
	Chronic	NOAEL	25	Rat	Decreased weight gain at 125 mg/kg
Picloram	Acute	NOAEL	200	Dog	Decreased body weight at 690 mg/kg. LOAEL of 400 mg/kg.
	Chronic	NOAEL	20	Rat	Increased liver weights at 60 mg/kg.
Sethoxydim	Acute	NOAEL	160[4]	Rabbit	Reduced number of viable fetuses, some dam mortality at 480 mg/kg
	Chronic	NOAEL	9	Dog	Mild anemia at 18 mg/kg/day
Sulfometuron methyl	Acute	NOAEL	87	Rat	Decreased body weight at 433 mg/kg
	Chronic	NOAEL	2	Rat	Effects on blood and bile ducts at 20 mg/kg/day
Triclopyr	Acute	NOAEL	100	Rat	300 mg/kg maternal toxicity
	Chronic	NOAEL	5	Dog	25 mg/kg kidney toxicity.

2 Imazapic – NOAEL calculated from a LOAEL of 137 mg/kg/day and application of a safety factor of 3 to extrapolate from a LOAEL to a NOAEL.

3 The acute NOAEL of 24 mg/kg is very close to the chronic NOAEL, so chronic value is used for acute exposures.

4 Source of the value used by EPA (180 mg/kg) is not well documented, so the lower value of 160 mg/kg from a rabbit study is used as the toxicity index for this analysis.

Source: SERA 1998, 2001, 2003, 2004, 2007, 2011 and Bakke, 2003.

Table 18: Exposure Scenario Results from FS Risk Assessments for Mammals, Birds, and Honeybees, using the Typical and Highest Application Rates and Assuming Upper Residue Rates

Symbol meanings are as follows:

-- Exposure scenario results in a dose below or equivalent to the toxicity index.

* Exposure scenario results in a dose that exceeds the toxicity index at typical and highest application rates.

♦ Exposure scenario results in a dose that exceeds the toxicity index at highest application rates only.

Animal/Scenario	Aminopyralid	Chlorsulfuron	Clopyralid	Glyphosate	Imazapic	Imazapyr	Metsulfuron methyl	Picloram	Sethoxydim	Sulfometuron methyl	Triclopyr
Acute Exposures											
Direct spray, bee	--	--	--	♦	--	--	--	--	--	--	--
Direct spray, sm. mammal	--	--	--	--	--	--	--	--	--	--	--
Consume contaminated vegetation											
small mammal	--	--	--	♦	--	--	--	♦	--	--	*
large mammal	--	--	--	♦	--	--	--	--	--	--	*
large bird	--	--	--	--	--	--	--	--	--	--	*
small bird	--	unk	--	♦	--	--	--	♦	--		*
Consume contaminated water											
Spill, sm. mammal	--	--	--	--	--	--	--	--	--	--	--
Consume contaminated insects											
small mammal	--	--	--	♦	--	--	--	♦	--	--	--
small bird	--	unk	--	♦	--	--	--	--	--	--	*
Consume contaminated prey											
carnivore (sm. mammal)	--	--	--	--	--	--	--	--	--	--	--
predatory bird (sm. mammal)	--	--	--	--	--	--	--	--	--	--	--
predatory bird (fish)	--	--	--	--	--	--	--	--	--	--	--
Chronic Exposures											
Consume contaminated vegetation											
small mammal, on site	--	--	--	♦	--	--	--	*	--	--	*
lg. mammal, on site	--	--	--	--	--	--	--	♦	--	♦	*
lg. bird, on site	--	--	--	♦	--	--	--	--	♦	♦	*
small bird on site	--	unk	--	♦	--	--	--	*	--	--	*
Consume contaminated water											
small mammal	--	--	--	--	--	--	--	--	--	--	--
Consume contaminated insects#											
small mammal	--	--	unk	unk*	--	--	--	unk	unk	unk	unk
small bird	--	--	unk	unk	--	--	--	unk	unk	unk	unk

Animal/Scenario	Aminopyralid	Chlorsulfuron	Clopyralid	Glyphosate	Imazapic	Imazapyr	Metsulfuron methyl	Picloram	Sethoxydim	Sulfometuron methyl	Triclopyr
Consume contaminated prey											
carnivore (sm. mammal)#	--	--	--	--	--	--	--	--	--	--	*
predatory bird (sm. mammal)#	--	--	--	--	--	--	--	--	+	--	--
predatory bird (fish)	--	--	--	--	--	--	--	--	--	--	--

Data are lacking regarding chronic exposures, so effects are assumed by comparing acute dose vs. chronic NOAEL, which will likely over-estimate actual risk.

unk – unknown; insufficient data to assess risk.

*unknown only at highest rates; typical rates pose no apparent risk.

+ Previous versions of this table showed an exceedence at high application rate for a chronic scenario. That is not shown here, because the actual estimated dose is equivalent to the toxicity index, rather than an exceedence.

While the amount of each herbicide/surfactant applied varies, many of the pdfs were specifically designed to ensure that any application rates used were below levels that would result in an exposure of a non-target species that exceeded the NOAEL.

Standards in the Malheur National Forest LRMP require that adverse effects to wildlife from invasive plant treatment be minimized or eliminated through project design and implementation. All action alternatives were designed to comply with these standards. Project Design Features and herbicide use buffers place restrictions on how and where herbicides are applied.

Results of the herbicide analysis indicate that birds and mammals consuming vegetation or insects that have been sprayed with some of the herbicides have the most potential to receive doses above the toxicity index, although other scenarios occasionally exceeded the toxicity index. While all proposed herbicides are considered low risk, in order to compare toxicity risks, proposed herbicides/surfactants were placed into the following four categories of “relative risk”. Adherence to invasive plant treatment standards and pdfs; actual animal behavior and feeding strategies, and/or seasonal presence/absence within treatment area reduce these risks. As a result and considering the limited spatial extent of infestation (over 80 percent of sites are 0.25 acres or less), the likelihood that wildlife would be exposed to harmful levels of herbicides is reduced.

- Herbicides that Don’t Pose a Risk – These include herbicides that don’t pose a risk to wildlife at either typical or highest application rates and include aminopyralid, chlorsulfuron, imazapic, imazapyr and metsulfuron methyl. There are no exposure scenarios anticipated that would result in adverse effects to wildlife from application of these herbicides.

- Lower Risk Herbicides – These herbicides which include clopyralid, sethoxydim imazapyr and sulfometuron methyl, did not pose a risk to wildlife at typical application rates, although sethoxydim and sulfometuron methyl posed a chronic risk to some species at the highest application rate. While data is lacking to fully assess chronic impacts to an insectivorous small mammal or bird, with implementation of pdf F2, these herbicides would not be applied above the typical application rate.

- Moderate Risk Herbicides – Glyphosate is included in this category. While it does not pose a risk at typical application rates, it does pose an acute and chronic risk for some groups at the highest application rate. While data is lacking to fully assess chronic impacts to an insectivorous small mammal or bird, with implementation of PDF 2, these herbicides would not be applied above the typical application rate.

- Higher Risk Herbicides– These include herbicides that pose a risk to one or more groups at both the typical and highest application rate and include triclopyr and picloram. Picloram is also more persistent in some soil types. While data is lacking to fully assess chronic impacts to an insectivorous small mammal or bird, with implementation of the Malheur National Forest LRMP standard, triclopyr is limited to spot/selective methods only. Additionally pdf H3 restricts use of picloram on certain soil types, whereas pdf H4 limits use of picloram on the same acreage to every other year. As a result and considering the small amount of picloram proposed for broadcast application, it is unlikely that these herbicides would pose a risk to wildlife.

Ultimately the risk that adverse effects would occur depends on a number of factors such as wildlife feeding strategy, seasonal activity, and the types and amounts of herbicides used. Also implementation of pdfs, herbicide-use buffers, and treatment limits reduce risk. As a result and considering none of the first year/first choice herbicides under alternatives B and C would result in adverse effects from herbicide exposure, wildlife would not receive an acute or chronic exposure or concern under any alternative.

Habitat Treated

As described above, effects to wildlife vary depending on the type of herbicide application proposed or the use of non-herbicide treatments. Also the effectiveness of the action alternatives at controlling or containing invasive plants varies by treatment. Table 19 displays the "first year first choice" treatments that would occur in each action alternative and identifies alternative treatments within wildlife habitats affected by invasive plants. The information presented is used in the alternative analysis to compare the extent and type of treatment within habitats affected and to help assess the effectiveness of each of the alternatives at controlling invasive plants.

Table 19: First year, first choice treatments by habitat type and action alternative

Habitat (Forest Acres)	Invasive Plant Acres (% infested)	Alternative B Acres			Alternative C Acres			Alternative D Acres		
		Herbicide		No Herbicide	Herbicide		No Herbicide	Herbicide		No Herbicide
		Bcast	Spot		Bcast	Spot		Bcast	Spot	
Dry Forest[4] (1,212,313)	1,386 (0.1)	845	541	0	0	532	854	390	996	0
Mesic Mixed Conifer (200,462)	355 (0.2)	219	136	0	0	109	246	87	268	0
Riparian Woodland[1,3] 141,008)	678 (0.5)	367	312	0	0	34	644	19	660	0
Riparian Shrub[1,3] (8,870)	64 (0.7)	29	35	0	0	2	62	1	63	0
Montane Meadow (4,910)	47 (1.0)	30	18	0	0	16	31	14	34	0

Habitat (Forest Acres)	Invasive Plant Acres (% infested)	Alternative B Acres			Alternative C Acres			Alternative D Acres		
		Herbicide		No Herbicide	Herbicide		No Herbicide	Herbicide		No Herbicide
		Bcast	Spot		Bcast	Spot		Bcast	Spot	
Steppe Shrubland[2,3] (115,193)	72 (0.1)	43	29	0	0	27	45	19	53	0
Sagebrush[3] (139,488)	79 (0.1)	14	65	0	0	22	57	14	65	0
Juniper Woodland (45,470)	28 (0.1)	14	14	0	0	8	20	5	23	0
Grassland[3] (68,443)	122 (0.2)	73	49	0	0	25	97	20	102	0
Wetland[3] (16,260)	69 (0.1)	38	31	0	0	5	64	3	66	0

1 – Some of the riparian habitats are also included as other forest or non-forest communities
2 – Some inclusions of sagebrush are included in steppe shrublands
3 – Habitats that are considered to be most "at risk" from invasive plants
4 – Understory vegetation within open canopy dry forest can be adversely affected by invasive plants.

Herbicide Effects to Pollinators

The honey bee is a standard test subject for required toxicity testing of pesticides, so there is data on risk to bees in the risk assessments for all herbicides included in this project. Of the herbicides proposed for use in this project, only glyphosate at the highest application rate pose a potential risk to bees.

For glyphosate, a relatively large number of acute toxicity studies have been conducted on bees and other species of terrestrial insects using both technical grade glyphosate as well as various glyphosate formulations, for both contact spray and dietary exposures (Appendix 4 in SERA 2011). Contact spray of glyphosate does not pose a risk of mortality to bees. Consumption of contaminated food can pose a risk to terrestrial invertebrates at the highest application rate (at typical rate no HQs are greater than 1). For glyphosate without the POEA surfactant (which is the case for this project), only the upper bound estimates at the highest application rate exceeded the NOAEL (HQ= 2-4).

Imazapyr poses no risk to bees even at the highest application rate proposed in this project. EPA classifies imazapyr as practically non-toxic to bees and the results of the Forest Service risk assessment state that this conclusion is clearly justified. Neither contact nor estimated oral doses exceeded the NOAEL (HQ <1), even at the highest application rate and upper exposure estimates.

Similarly, chlorsulfuron, clopyralid, imazapic, picloram, sethoxydim or sulfometuron methyl, at the highest application rate and upper exposure estimates did not exceed the NOAEL (HQ<1) for bees in direct contact or estimated dietary exposures.

Triclopyr TEA and BEE at the highest application rates and upper exposure estimates exceed the NOAEL for dietary exposures (HQ = 2-5). Central estimates of exposure, even at the highest application rates are equivalent to the NOAEL. Direct spray scenarios do not pose a risk to bees (SERA 2011).

None of the herbicides indicated a risk to bees in the risk assessment. With implementation of pdf F2 which restricts broadcast application of glyphosate, it is not expected that bees or pollinators would be exposed to toxic levels of herbicide under any action alternative.

Effects of Alternative B

Direct and Indirect Effects

Under alternative B a total of 2,124 acres would be treated with herbicides, including 1,281 acres of broadcast application and 843 acres of spot treatments during the first year of treatment. Future treatments would be determined by the effectiveness of the initial herbicide treatments and it is expected that as existing infestations are reduced, a combination of herbicide and non-herbicide methods would be used. Due to the ability to use aminopyralid and thus broadcast spray more area, alternative B is expected to include less future manual and mechanical treatments, than alternatives C or D.

Effects of manual, mechanical and bio control treatments would be similar to those described under effects common to all action alternatives. Because alternative B would have fewer manual/mechanical treatments and considering these treatments pose a greater risk of disturbance to wildlife than herbicides, the likelihood of disturbance or mortality during treatment is reduced under this alternative. The likelihood of direct effects are further reduced, when you consider that one percent or less of any of the affected habitats would be treated, that existing sites are small and scattered, and that approximately 88 percent of the known sites occur along roads which provide less preferred habitat for many wildlife species. Finally, using the implementation process Forest Service personnel would develop annual treatment prescriptions for all existing and new (EDRR described below) invasive plant infestations. This would include identification of wildlife species of local interest or their habitats and implementation of appropriate pdfs, including modification of treatment methods/timing if necessary to reduce potential risks. Collectively for these reasons the likelihood of mortality for any wildlife species is low and any disturbance would be short-term in nature.

Effects of herbicide application would be similar to those described above under effects common to all alternatives. None of the first choice/first year herbicides resulted in an acute or chronic dose that exceeded the toxicity index for any wildlife species. While other herbicides could be used in subsequent years to achieve objectives, with implementation of pdfs, Forest standards and treatment buffers and considering annual treatment prescriptions would identify species/habitats of concern and modify treatment type and timing if necessary, there are no adverse effects to wildlife from herbicide exposure anticipated.

Effects to habitat vary by the size of the infestation and effectiveness of treatment. For example, while bare ground can be created in dense patches of invasive plants, effects to wildlife would be reduced because these areas do not provide preferred habitat. Also only approximately 250 acres have 50 percent infestation or more and all sites would continue to provide cover during and following implementation. Because alternative B includes the fullest range of treatment options it is assumed invasive plants would be reduced on approximately 80 percent of acres treated. As a result alternative B would be most effective at promoting the long-term maintenance of native vegetation and wildlife, including “at risk” habitat.

Malheur National Forest Land and Resource Management Plan (LRMP) Amendment

The proposed LRMP amendment to add aminopyralid would likely improve the effectiveness of treatment. This would result in neutral or positive impacts to wildlife on the MNF because aminopyralid poses no likely risk to wildlife and would effectively treat invasive plants which can degrade habitat.

Early Detection Rapid Response

In addition to proposed treatments, Alternative B would allow treatment of new detections (EDRR), as long as the treatment method is within the scope of this EIS. The treatment of newly found sites adds additional risk factors to wildlife just by adding additional exposure areas. This also expands the treatment into areas that may not have been originally anticipated. The implementation planning process would be used with each new infestation site to determine treatment. Also the pdfs have been set up to provide layers of caution so that even if the exact locations are not known, the potential for adverse effects are minimized. Implementation of pdfs and herbicide use buffers and treatment limits would work together to provide sideboards to deal with the uncertainty of treating new sites (USDA Forest Service 2008b) and ensure that direct and indirect effects are consistent with those anticipated in the FEIS. Alternative B would be most effective at controlling infestations detected in the future.

Effects of Alternative C

Direct and Indirect Effects

Under Alternative C, non-herbicide treatments would be increased on 1,389 acres during the first year of treatment and more repeated manual/mechanical treatments would occur in subsequent years. Effects of treatments would be similar to those discussed under treatment effects common to all action alternatives. Because manual/mechanical treatments can increase the likelihood of disturbance to less mobile species, the likelihood of direct effects are increased somewhat under this alternative. Like alternative B and for reasons described above, the likelihood of direct effects are low. Potential for effects are further reduced when you consider implementation of pdf's and that annual treatment prescriptions would be prepared for all new infestations that would identify wildlife species of local interest or their habitats and modify treatment methods/timing if necessary to reduce potential risks. So while treatment risks are increased somewhat under this alternative due to the increased use of manual/mechanical activities, collectively for these reasons the likelihood of mortality for any wildlife species is low and any disturbance would be short-term in nature.

Effects of herbicide exposure would be similar to those described under effects common to all action alternatives. Like alternative B none of the first choice/first year herbicides resulted in an acute or chronic dose that exceeded the toxicity index for any wildlife species. While other herbicides could be used in subsequent years to achieve objectives, with implementation of pdfs, Forest standards and treatment buffers and considering annual treatment prescriptions would identify species/habitats of concern and modify treatment type and timing if necessary, there are no adverse effects to wildlife from herbicide exposure anticipated.

Like alternative B cover would be retained on all treatment sites and there would be little change in wildlife habitat conditions in the short-term. However requiring only non-herbicide treatments on much of the infested areas would reduce effectiveness compared to using herbicides in combination with non-herbicide treatments and overall treatment effectiveness would be reduced by almost half from that of alternative B. So while implementation of alternative C would help contain or control invasive plants, it would be less effective than alternatives B or D.

Malheur National Forest Land and Resource Management Plan (LRMP) Amendment

The proposed LRMP amendment to add aminopyralid would likely improve the effectiveness of treatment. This would result in neutral or positive impacts to wildlife on the MNF.

Early Detection Rapid Response

Like Alternative B, alternative C would allow treatment of new detections (EDRR), as long as the treatment method is within the scope of this EIS. The treatment of newly found sites adds additional risk factors to wildlife just by adding additional exposure areas. This also expands the treatment into areas that may not have been originally anticipated. However, the implementation planning process would be used with each new infestation site to determine treatment. The pdfs have been set up to provide layers of caution so that even if the exact locations are not known, the potential for adverse effects are minimized. Implementation of pdfs, buffers and treatment limits (i.e. leaving stream corridors untreated) all work together to provide sideboards to deal with the uncertainty of treating new sites (USDA Forest Service 2008b) and ensure that direct and indirect effects are consistent with discussed in the alternative and species specific analysis presented. Alternative C would be the least effective of the action alternatives at controlling future infestations due to the restrictions on treatment.

Effects of Alternative D

Direct and Indirect Effects

Alternative D is similar to alternative B, except that aminopyralid would not be approved for use. As a result, use of chlorsulfuron (a lowest risk herbicide) would increase and some moderate (glyphosate) to higher risk herbicides (picloram) would be used as first choice/first year treatments. Use of herbicides other than aminopyralid would also require increased use of spot application within all habitats except sagebrush. Effects of treatment would be similar to those described under effects common to all action alternatives. While the increase in spot application would increase risks of direct effects from those of alternative B, when you consider that one percent or less of any of the affected habitats would be treated, that existing sites are small and scattered, and that approximately 88 percent of the known sites occur along roads, the likelihood of direct effects are low. Potential for effects are further reduced with implementation of pdfs and considering annual treatment prescriptions would be prepared for all existing and new infestations that would modify treatment methods/timing if necessary to reduce potential risks. So while treatment risks are increased somewhat under this alternative, like the other action alternatives, with implementation of pdfs the likelihood of mortality for any wildlife species is low.

Use of moderate to higher risk herbicides would occur on approximately 788 acres or 37 percent of infested acres treated during the first year. Effects of herbicide exposure would be similar to those described under effects common to all action alternatives. While the exposure to moderate or higher risk herbicides is increased somewhat under this alternative, with implementation of pdfs, Forest standards and treatment buffers risks would be reduced. As a result and considering annual treatment prescriptions would identify species/habitats of concern and modify treatment type and timing if necessary, there are no adverse effects to wildlife from herbicide exposure are anticipated.

Proposed treatments would reduce existing infestation of invasive plants across the project area and promote native wildlife habitat. Like alternatives B and C, reductions in cover would be small and scattered and there would be little change in the availability of wildlife habitat. Because aminopyralid is not approved under this alternative, treatment effectiveness of the sites would be approximately 66 percent of the sites treated. Much of the reduction in effectiveness would occur along streamsides due to increased buffers if aminopyralid is not approved. While alternative D would be effective at reducing invasive plants, it would be less effective at promoting the long-term maintenance of native vegetation and wildlife habitat than alternative B.

Malheur National Forest Land and Resource Management Plan (LRMP) Amendment

No amendment is proposed for Alternative D.

Early Detection Rapid Response

Like alternative B, alternative D would allow treatment of new detections (EDRR), as long as the treatment method is within the scope of this EIS. While treatment would add additional risks to wildlife, annual prescriptions would be developed and treatment timing/methods modified if necessary. Like the other action alternatives, project design features, annual prescriptions and herbicide-use buffers all work together to provide sideboards to deal with the uncertainty of treating new sites (USDA Forest Service 2008b) and ensure that direct and indirect effects are consistent with those anticipated. Alternative D would be less effective in reducing invasive plants than alternative B.

Cumulative Effects

The cumulative effects analysis area includes all lands within the Forest proclamation boundary. This area contains a diversity of habitat conditions, is large enough to assess species with large home ranges as well as migratory species, and allows for assessment of potential impacts on the Malheur National Forest as well as other ownerships. Anticipated cumulative effects are evaluated out for the next 15 years, which is the implementation period for this project and is the period when future projects can be reasonably predicted.

The effects of past management activities on wildlife habitat conditions are largely reflected in the wildlife affected environment. Past management activities on the Malheur National Forest in combination with a conservative approach to invasive plant treatment has resulted in an increase in invasive plant infestation across the Forest. Also on-going and foreseeable future actions will continue to promote the spread of invasive plants. Activities on NFS lands that could further increase the spread of invasive plants and affect wildlife habitat include prescribed burning, timber harvest and reforestation treatments, fuel reduction, plantation thinning, road closure , maintenance and decommissioning, facility/recreation projects, grazing and agriculture. These activities will occur Forest-wide and are spread out over 60 sub-watersheds (HUC6). Other activities that may occur outside of these watersheds include mineral development and access/travel management. Anticipated foreseeable projects are displayed in table 20.

Table 20: Foreseeable Future Projects on MNF with project details, vectors for invasive plant spread, watershed(s) affected and Implementation Schedule

Project name	Project Details	Potential Vector	Watershed(s)	Implementation Schedule
Bald Butte LO Decommission	Remove Lookout with explosives	Recreation Site management	Middle Silver Creek	2013
Bear Creek Riparian Juniper Thinning	thin 47 acres of juniper	Vegetation Management	Upper South Fork John Day River	2014

Project name	Project Details	Potential Vector	Watershed(s)	Implementation Schedule
Blue Mountain Snow Park	Clearing trees and leveling 7 acres and paving parking area; construction of warming hut, restrooms, and grooming shed; construction of pad for fuel tank	Recreation Site management	Summit Creek (170702030102)	2013
Buck and Rock Springs Campground Hazard Tree Removal Project	remove hazard trees	Recreation Site management	Upper Silver Creek and Wolf Creek	2013
Camp Creek LWD	Felling and placing entire trees ranging from 4- 20 inches in diameter within the following streams and their associated Riparian Habitat Conservation Areas (RHCAs)	Stream Restoration	Upper Camp Creek (170702030205); Lick Creek (170702030205)	2013-14
Campground Hazard Tree Project	Remove hazard trees in D-Lake, Idlewild, Joaquin Miller, Yellowjacket, Emigrant Creek, Falls Camp	Vegetation Management	Upper Silver, Upper Silvies, North Basin, Emigrant Creek	2013
Dairy EA	Commercial harvest, road closures and decommissioning	Vegetation Management	Upper Silver Creek	2013-2014 road closures may go on for years
Damon	RX fire, commercial and non-commercial harvest, road closures and decommissioning	Vegetation Management, Closing Roads, Restoring Roads and Landings	Van Aspen-Silvies River (171200020105); Lower Scotty Creek (171200020104); Shirtail Creek (171200020301)	FY 11 to FY 13
Dragon's Head Plantation PCT	thin plantations	Vegetation Management - Ground disturbance, open canopy	Wolf Creek and Upper Silvies River	2013 and beyond
Dragon's Hump Plantation PCT	PCT and treat slash on 5000 acres of plantations	Vegetation Management	Middle Silvies and Emigrant Creek	2013 and beyond
Egley Aspen Restoration Project	thin and remove conifers up to 20.9 inches in 20 acres of aspen	Vegetation Management	Emigrant Creek	2013

Project name	Project Details	Potential Vector	Watershed(s)	Implementation Schedule
Egley/Pine Springs Overlook Interpretive Display Update and Toilet Replacement project	replace toilet	Recreation Site management	Middle Silver Creek	unknown, no funding, low priority
Elk 16	RX fire, commercial and non-commercial harvest, road closures and decommissioning, aspen restoration, aquatic restoration	Vegetation Management, Closing Roads, Restoring Roads and Landings, Stream Restoration	Elk Creek and Crane Creek Subwatershed	FY 2015
Galena Project	RX fire, commercial and non-commercial harvest, road closures and decommissioning	Vegetation Management, Closing Roads, Restoring Roads and Landings	Vinegar Creek-MFJDR (170702030201); Little Boulder Creek-MFJDR (170702030202)	FY 14 to FY 17
Green Ant Project (Formerly the Ant and Emigrant Projects)	Commercial harvest, road closures and decommissioning	Vegetation Management	Emigrant Creek	2013 and beyond
Idlewild Snowpark Relocation Project	Relocate snowpark	Recreation Site management	North Basin	2013
Jane Hazardous Fuel Reduction Project	RX fire, commercial and non- commercial harvest, road closures and decommissioning	Vegetation Management, Closing Roads, Restoring Roads and Landings	Wolf Creek	2013 and beyond
JB Spring Development and Trough	Develop spring, thin 5 acres of juniper	Livestock Grazing, Vegetation Management	Griffin Creek/Upper Malheur River	2013
Keeney Meadows Aspen	Non-commercial thinning and fencing 10 aspen stands	Vegetation Management	Bridge Creek (170702030105); Headwaters Long Creek (170702030401); East Fork Beech Creek (170702010802); Upper Camp Creek (170702030205); Headwaters Long Creek (170702030401);	July - Aug 2014
Logan Valley Grazing Authorization	Grazing authorization on the Summit Prairie, Logan Valley, McCoy Creek, and Lake Creek Grazing Allotment	Livestock Grazing	Lake Creek, Bosenberg Creek, Upper Big Creek, Summit Creek Subwatershed	FY 2014

Project name	Project Details	Potential Vector	Watershed(s)	Implementation Schedule
Malheur River Range Aquatics Projects	Extension of the Malheur River Drift Fence. Cross Springs water source reconstruction and extension to a second trough. Development of Dollar Basin Spring	Livestock Grazing	Lake Creek and Bosenberg Creek Subwatershed	FY 2013
Marshall/Devine Hazardous Fuel Reduction Project	RX fire, commercial and non-commercial harvest, road closures and decommissioning	Vegetation Management, Closing Roads, Restoring Roads and Landings	Upper Silvies River and North Basin	2013-2014 road closures may go on for years
Murderer's Creek Juniper Management Project	Cutting of juniper and mixed conifer, fuel treatment, aspen restoration, and watershed improvement activities.	Vegetation Management; Stream Restoration	Deardorff Creek (170702010502); Corner Creek-South Fork John Day River (170702010402); Lower Murderers Creek (170702010305); Lower Deer Creek (170702010206)	FY 2014
Plantation Maintenance Fox/Camp Creek	Non-commercial thinning of plantations	Vegetation Management	Dixie Meadows (170702010602); Bear Creek (17070201603); Grub Creek (170702010607); Upper Beech Creek (170702010801); East Fork Beech Creek (170702010802); Lower Beech Creek (170702010803); Birch Creek (170702010905); Dry Creek-John Day River (170702010906); Belshaw Creek (170702011003); Cummings Creek (170702011005); Wiley Creek (170702020902); McHaley Creek (170702020903); Lower Fox Creek (170702020904); Upper Cottonwood Creek (170702020905); Upper Camp Creek (170702030205); Lick Creek (170702030206); Lower Camp Creek (170702030207)	FY 13 to FY 23

Project name	Project Details	Potential Vector	Watershed(s)	Implementation Schedule
Plantation Maintenance Long Creek	Non-commercial thinning of plantations	Vegetation Management	Indian Creek-MFJDR (170702030303); Slide Creek (170702030304); Granite Creek-MFJDR (170702030305); Headwaters Long Creek (170702030401); Upper Long Creek (170702030402); Basin Creek (170702030404); Basin Creek (170702030406); Upper Deer Creek (170702021001); Upper Fox Creek (170702020901); McHaley Creek (170702020903)	FY 12 to FY 22
Sawtooth and Emigrant Creek Culvert Replacement	replace culverts	Stream restoration	Emigrant Creek	Sawtooth complete, Emigrant creek not, no funding, low priority
Sawtooth and Nicoll Checkdam Modification	modify existing structures	Stream restoration	Emigrant Creek and Upper Silver Creek	unknown, no funding, low priority
Schurtz Creek Story-Fry Riparian Restoration Project	Fence and thin conifers less than 21 inches	Vegetation Management	Wolf Creek	2013-2014
Season of Burn Research Project	Rx burn research units	Vegetation Management	Pine Creek and Upper Silvies River	2013 and beyond
SF John Day Culverts Replacements	Replace 3 culverts	Stream Restoration	Upper South Fork John Day River	2013 and beyond
Soda Bear	RX fire, commercial and non-commercial harvest, road closures and decommissioning	Vegetation Management, Closing Roads, Restoring Roads and Landings	Middle Bear Creek (171200020202); Lower Bear Creek (171200020204)	FY 13 to FY 15
South Fork John Day Riparian Juniper Thinning	thin 90 acres of juniper	Vegetation Management	Upper South Fork John Day River	unknown, no funding, low priority
Starr Aspen	Commercial and Non-commercial thinning, Rx fire, fencing, wood in streams, road closures	Vegetation Management, Closing Roads, Restoring Roads and Landings, Stream Restoration	Starr Creek-Silvies River (171200020102)	FY 15

Project name	Project Details	Potential Vector	Watershed(s)	Implementation Schedule
Starr HFRA	RX fire, commercial and non-commercial harvest, road closures	Vegetation Management, Closing Roads, Restoring Roads and Landings	Starr Creek-Silvies River (171200020102)	FY 12 to FY 15
Summit	RX fire, commercial and non-commercial harvest, road closures and decommissioning, aspen restoration, aquatic restoration	Vegetation Management, Closing Roads, Restoring Roads and Landings, Stream Restoration	Summit Creek and Tureman Creek Subwatersheds	FY 2016
Thompson Butte SUP Passive Reflector Removal	remove reflector	Recreation Site management	Pine Creek	2013
UMF Culvert Replacement	Replacement of 15 culverts located on twelve tributaries in two watersheds of the Middle Fork John Day River subbasin.	Stream Restoration	Summit Creek (170702030102); Bridge Creek (170702030105); Vinegar Creek-MFJDR (170702030205); Little Boulder Creek-MFJDR (170702030202); Granite Boulder-MFJDR (170702030203); Balance Creek (170702030208)	July - Aug 2014
Upper Pine Hazardous fuel Reduction Project	RX fire, commercial and non-commercial harvest, road closures and decommissioning	Vegetation Management, Closing Roads, Restoring Roads and Landings	Pine Creek	2014-2015 road closures may go on for years
Voigt Ditch Headgate Replacement	Replacing current head gate with a new one including a measuring device and extending pipe down existing easement.	Adjacent Agriculture	Mill Creek (170702030106)	July - Aug 2013
Whistle Rx Burn	Rx Burn 3450 acres	Ground disturbance, open canopy	Upper Silver Creek	unknown, low priority
Access and Travel Management	Designating roads available for use	Road Use	All	On Hold

Under all action alternatives, some level of invasive plant control would occur on 2,124 acres and of this, 1,067 acres occur within watersheds where some future management activity is anticipated. Watersheds that contain mapped invasive plants and future management activities are displayed in table 21. However, through the life of the project, newly detected infestations in any watershed could be treated according to the alternative selected.

Table 21: Watersheds containing planned future activities and invasive plant treatments

Watershed	Future Activity[1]	Invasive Plant Treatments[2]
Birch Creek	P	1
Bosenberg Creek	G	4
Bridge Creek	T, R,G	26
Crane Creek	T,B,	12
Deardorff Creek	T	11
Dry Cr. John Day River	P	<1
Elk Creek	T,B	24
Emigrant Creek	T,R	44
Granite Boulder Creek	R,P	120
Long Creek	P	1
Indian Creek	P	1
Lake Creek	G	3
Lick Creek	G	8
Little Boulder Creek	T,B,R	139
Long Creek	P	18
Lower Bear Creek	T,B	1
Lower Deer Creek	T,	1
Lower Scotty Creek	T,B	3
Middle Bear Creek	T,B	2
Middle Silvies River	R	6
Mill Creek	R	145
North Basin	T,B,F,R	15
Pine Creek	B,R,	79
Slide Creek	P	6
Starr Creek	T,F,B	16
Summit Creek	T,B,G	15
Upper Big Creek	G	5
Upper Camp Creek	G	14
Upper Deer Creek	P	1
Upper Fox Creek	P	22
Upper Long Creek	P	18
Upper Malheur River	P	45
Upper S. Fk. J.D. River	T	46
Upper Silver Creek	T,B,R	20
Upper Silvies River	T,B,F,R,P	56
Van Aspen-Silves River	T,B	15
Vinegar Creek	T,B,R	81
Wiley Creek	P,B,R	2
Wolf Creek	T	38
Total Invasive Plant Treatment		**1,067**

1 – Activity Codes (T)-Timber harvest, (B)-Burning, (F)-Fuel Reduction, (R)-Recreation/facility, (P)-Plantation thinning, (G)-Grazing improvements. 2 – Invasive plant treatments that don't occur in watersheds with future treatments are not displayed.

Virtually all of the ongoing/future activities identified in table 20 would increase human access and disturbance to wildlife, although effects vary by species. Because approximately 88 percent of the treatments currently occur close to open roads, there would be little increase in human access due to proposed activities. Also pdfs are in place that reduce or restrict access to sensitive wildlife habitat. As a result and considering treatment would be limited to a few days a year at any site, and one percent or less of any watershed would be affected, any disturbance associated with herbicide or non-herbicide treatments would be short term and there are no long-term adverse effects associated with increased access.

While all ongoing/future activities would alter wildlife habitat, timber harvest and associated reforestation treatments, prescribed burning/fuel treatments, and plantation thinning would result in the greatest change in habitat. These activities would reduce the overstory canopy, create more open understory conditions within forested stands and/or alter woody/herbaceous vegetation within non-forest. Effects to wildlife vary by species and are discussed in part in the individual species analysis presented below. Potential effects to wildlife are also determined by the amount of habitat affected, effects to species considered at risk or threatened, endangered and sensitive species, and the availability of unaffected habitat. As shown in table 21, these activities would occur across 32 watersheds that also contain invasive plant treatments. When you consider; 1) that project pdfs are in place to protect at risk species from herbicide and non-herbicide treatments, 2) that forest plan standards will reduce impacts from future management on many at risk wildlife species and sensitive wildlife habitats, 3) that future management actions would maintain or improve wildlife habitat for fire dependent species, species that utilize open understories, and aspen/shrubland steppe dependent species, 4) that proposed treatments would reduce the spread of invasive plants, and 5) that one percent or less of any watershed would be affected by proposed activities, implementation of anticipated future activities, combined with proposed actions are not expected to reduce the availability of wildlife habitat or significantly affect wildlife.

On-going grazing would continue to promote the spread of invasive plants and create bare soil in livestock concentration areas (salt licks, along fences and watering areas), particularly in riparian and non-forested habitats. Effects also include reduced cover and forage and a decrease in native species diversity, particularly for highly palatable hardwoods and shrubs. Future effects would be reduced with implementation of annual operating plans that establish allowable use standards and limit use within riparian habitat or areas important to wildlife (e.g. key winter range), changes in livestock movement patterns, alterations of season of use and delayed re-introduction following wildfire. Finally the Forest recognized that use of pack stock increased the risk of invasive plants and in 2009 the region issued a directive requiring use of weed free hay. So while on-going grazing and Forest-wide use of stock would continue to be a factor in the spread of invasive plants, risks would be reduced from what occurred historically.

New road construction associated with vegetation management, as well as on-going road management, including new restoration and closure would continue to serve as a source of invasive plants. Public use of these areas including increased recreational use would also increase levels of disturbance, particularly along high use trails and at trailheads and camping areas. Effects to wildlife include a reduction in forest on lands affected by new road construction, continued use and disturbance along existing road corridors, and some changes in cover and forage along road right-of-ways, or on the roadbed itself (i.e. road restoration). Most new road construction associated with vegetation activities would be temporary and if a road accessed an area important to wildlife, it would be closed during implementation. Also any temporary roads constructed would be put to bed following use. While on-going road use would continue to adversely affect interior species or species sensitive to disturbance (e.g. elk and northern goshawk), effects would be largely limited to existing road corridors which are already avoided and there would be little change in habitat availability for these species due to road management.

Non-federal activities that would occur within the project area during the analysis period include mining, agriculture, grazing, road and utility right-of-way maintenance and invasive plant treatment. Because of the disturbance associated with these activities and considering that most occur in non-forest areas that are at risk from invasive plants, off-forest activities would increase the likelihood of invasive plants. Effects to wildlife include a possible reduction in cover and forage if new infestations become established or existing ones are not contained. Also some wildlife could be displaced during the treatment or activity.

Effects of ongoing/future activities on wildlife vary depending on the amount and distribution of habitat affected, protection or maintenance of sensitive or uncommon habitats and the extent of and length of time that habitat is modified. While on-going/ future management would increase the risk of invasive plants on all ownerships and alter wildlife cover and forage within the project area, adverse effects to wildlife and wildlife habitat are reduced when you consider 1) that effects to wildlife and wildlife habitat from many activities would be short-term in nature, 2) that most future management activities occur in forested habitat which provides less desirable habitat for many of the invasive plants, 3) that project level mitigations for many activities would be implemented to reduce weed infestation (e.g. us of weed free hay and re-seeding with native vegetation), 4) that potential effects to sensitive or unique wildlife habitats would be reduced with implementation of Malheur National Forest Plan Standards, as well as INFISH buffers and management restrictions within riparian habitat and wetlands, 5) that first choice treatment sites would be scattered across multiple watersheds and only one percent or less of any watershed would be affected, and 6) that implementation of pdfs and the annual treatment prescription process would reduce effects of invasive weed treatment to species or habitats of special concern.

In addition to proposed treatments, all action alternatives would allow treatment of new detections (EDRR), as long as the treatment method is within the scope of this EIS. The treatment of newly found sites adds additional risk factors to wildlife just by adding additional exposure areas. This also expands the treatment into areas that may not have been originally anticipated. The decision process identified in section 2.32 of the EIS would be used with each new infestation site to determine treatment. In addition, pdfs have been set up to provide layers of caution so that even if the exact locations are not known, the potential for adverse effects are minimized. Implementation of pdfs, buffers and treatment limits (i.e. leaving stream corridors untreated) all work together to provide sideboards to deal with the uncertainty of treating new sites (USDA Forest Service 2008b).

Herbicides are commonly applied on lands other than National Forest for a variety of agricultural, landscaping and invasive plant management purposes. Herbicide use occurs on tribal lands, state and county lands, private forestry lands, rangelands, utility corridors, road rights-of-way, and private property. Since wildlife move and migrate, some species could be exposed to herbicides on NFS lands, as well as adjacent lands that are within their home range or along travel corridors. Consequently species could be exposed to the same herbicide on multiple ownerships, or a combination of different herbicides. Wildlife could also be exposed to other chemicals, such as insecticides, rodenticides, fungicides, and others. While potential for multiple herbicide exposures to wildlife exists, the risk that adverse effects would occur depends on a number of factors such as wildlife feeding strategy, seasonal activity, and the types and amounts of herbicides used. The following considerations collectively reduce potential impacts from herbicide exposure on wildlife:

- While total acres of herbicides proposed on other ownerships are not available, counties are responsible for controlling noxious weeds along county roads and other county property outside of and within the MNF. They also work with conservation districts, weed management areas, and watershed councils to control noxious weeds on private property. So while additive herbicide exposures are possible if herbicide is used on neighboring lands during the same day as NFS land are treated, activities occurring on the Forest Service, other federal agencies, states, and counties would be coordinated, making treatment overlaps unlikely.

- The herbicides proposed for use a do not significantly bio-accumulate (R6 2005 FEIS). For additive doses to occur, two exposures would have to occur at approximately at the same time. At proposed application rates and with implementation of pdfs, it is unlikely that any species would receive additive doses beyond those evaluated for chronic and acute exposures in the USDA Forest Service risk assessments.

- The likelihood that wildlife would receive a toxic level of herbicides are reduced because herbicides used are excreted within 48 hours and herbicide persistence is reduced through implementation of pdfs.

- The pdfs for this project add a measure of protection for wildlife on NFS lands; however, wildlife may be more vulnerable on other ownerships where chemical use and protection measures are unknown. Within the project area, treatments are spread out over 100 HUC 6 watersheds, which vary in size between 10,000 and 38,000 acres. As a result one percent or less of all affected watersheds proposed for treatment. The widely scattered nature of proposed treatments, combined with the small size of infestations (over 80 percent less than one-quarter acre), and availability of unaffected habitat reduce the likelihood that any wildlife species that utilizes multiple ownerships would exposed to toxic levels of herbicide regardless of the chemical use on other ownerships.

- The management direction included in all action alternatives as well as the environmental conditions and animal behavior would tend to minimize actual impacts for EDRR. Prior to implementation choices could be made to avoid situations that could cause harm to wildlife. For example, certain herbicides could be avoided in specific areas or times of the year where/when species that utilize grass such as amphibians may be at risk, or more specific application methods could be used. These factors would be evaluated prior to treatment and pdfs applied that modify treatment methods/timing if necessary to reduce potential impacts to wildlife. Effects of treatments each year under early detection-rapid response, by definition, would not exceed those predicted for the most ambitious conceivable treatment scenario. This is because the pdfs do so much to control the potential for adverse effects and because if the most ambitious treatment scenario were implemented, the potential for spread into new areas would be greatly reduced.

Collectively for the above reasons, and considering the small amount of habitat affected by first choice/first year treatments, it is unlikely that any proposed treatments would measurably contribute to any other activities within the project area that would result in significant adverse effects to wildlife.

Effects to Federally Listed Species

Effects determinations for federally listed species are shown in the table 22.

Table 22: Draft Findings and Determinations for ESA-Listed Wildlife Species in the Project Area

Species	Action Alternative Determination	Reason
Canada Lynx	No Effect	Lynx have not been documented on the Forest and suitable habitat would be unaffected by treatments.
North American Wolverine	No Effect	Wolverine use of the project area is low and use would not occur within treatment sites.
Yellow-billed Cuckoo	May Affect, Not Likely to Adversely Affect	Yellow-billed cuckoo have not been documented on the Forest. Little riparian habitat is proposed for treatment and pdf's would protect breeding birds, should they become established.

Canada Lynx

Direct, Indirect, Cumulative Effects and Determination

The Malheur National Forest is categorized as a "peripheral area" based on the Draft Lynx Recovery Outline (USDI FWS 2005a) and there is no documentation of lynx reproducing in the state of Oregon. The Forest has not had a verified lynx observation since 1999, therefore the Forest is considered "unoccupied" habitat (USDI FWS 2006a). Currently only eight acres of foraging and den habitat are proposed for treatment. Due to the small amount of suitable habitat affected and considering the project area is not considered occupied lynx habitat, there would be no direct, indirect or cumulative effects and implementation of the action alternatives would have No Effect on lynx.

North American Wolverine

Direct, Indirect, Cumulative Effects and Determination

Wolverines occur in remote areas and have not been recently documented on the MNF. Also there is less than an acre of invasive plants proposed for treatment within potential den habitat. Wolverine utilize higher elevations during the snow free period to avoid high temperatures and human activity (Ruggiero et al 1999), thus direct effects to wolverine from proposed treatments are not anticipated. Similarly, because they prefer closed canopy forest habitat at upper elevations, wolverine habitat would not be adversely affected by invasive plants. As a result there are no direct, indirect, or cumulative effects to this species or its habitat anticipated and implementation of any action alternative would not jeopardize wolverine viability.

Yellow-billed Cuckoo

Direct and Indirect Effects

Approximately 2,136 acres of riparian woodland habitat occurs on the Forest. Of this, 28 acres are proposed for treatment with herbicides, including 27 acres with broadcast application and one acre of spot application. Aminopyralid and chlorosulfuron are the first year/first choice herbicides proposed.

Treatment – Effects of manual and mechanical treatments are discussed above and potential effects include disturbance to nesting birds by people, equipment or noise. Yellow-billed cuckoo nest in large riparian areas in shrubs, trees or cottonwoods approximately 10 to 16 feet of the ground (Washington DFW 2012, Center for Biodiversity 1998). Because woody vegetation is not targeted for treatment, it is unlikely nests would be affected, although nesting birds could be disturbed or displaced during treatment. In order to reduce the likelihood that breeding birds, nests or young are harmed, the following project design feature would be implemented.

- J13-a - If a known breeding site is proposed for treatment, a biologist will be contacted to determine necessary protection measures. These measures may include limitations on vehicle entry, modifications to treatment type or timing, or implementation of buffers. Protection measures would be coordinated with the USFWS.

With implementation of this design feature, treatment within occupied habitat would be modified or deferred to protect nesting birds. Disturbance to migrating birds could occur, although effects would involve short-term (a few days) displacement and unaffected suitable habitat would continue to be available.

Herbicides - Risk of effects from herbicide exposure was evaluated using the insectivorous bird scenario. Aminopyralid is the first year/first choice herbicide on all sites and no adverse effects from herbicide exposure are anticipated.

Of the herbicides approved, tryclopyr exceeded a dose of concern for an acute exposure at the typical and highest application rates, whereas glyphosate exceeded the NOAEL at the highest application rate. Data was lacking to evaluate a chronic exposure of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl, and triclopyr on small birds consuming insects

Triclopyr is restricted to spot techniques and pdf J2 restricts broadcast application of clopyralid, glyphosate, picloram, sethoxydim and sulfometuron methyl to typical application rates, whereas triclopyr is restricted to the typical application rate or less. With implementation of these design features the likelihood of herbicide exposure is reduced. The cuckoo's feeding strategy further reduces risk, in that it forages over a large area (California PIF 1998), sites proposed for treatment are small and scattered, and much of its foraging takes place on woody vegetation (Birds of North America 2013, California Partner In Flight 1998) which would not be targeted for treatment. As a result and considering the small amount of habitat proposed for treatment, it is unlikely that a bird would receive an acute (consume nothing but contaminated prey for an entire day) or chronic exposure (consume nothing but contaminated prey for 90 days) of concern. Finally, with implementation of pdf J13-a, which protects known breeding sites, there are no adverse effects from herbicide exposure anticipated.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. While riparian habitat on NFS land would be maintained with implementation of LRMP direction and standards, there could be a reduction in suitable yellow-billed cuckoo habitat on other ownerships within the project area due to future development or changes in vegetation. Because this species prefers dense understory vegetation, overgrazing could also reduce habitat. On NFS lands, range administration adjustments such as changes in livestock movement patterns, alterations of season of use, adherence to allowable use standards and delayed re-introduction following wildfire would be used to reduce grazing impacts to riparian vegetation and suitable yellow-billed cuckoo habitat.

Herbicides are commonly applied on lands of other ownerships for a variety of agricultural, landscaping and invasive plant management purposes and it is possible that birds could be exposed to the same herbicide on multiple ownerships, or a combination of different herbicides. While potential for multiple herbicide exposures exists, the risk that adverse effects would occur are reduced when you consider that 1) coordinated efforts make treatment overlap unlikely, 2) proposed herbicides do not significantly bio-accumulate (R9 2005 FEIS), 3) proposed herbicides are excreted within 48 hours, and 4) the small amount of habitat proposed for treatment. As a result and considering pdf's would protect breeding birds from proposed and future (EDRR) treatments, there are no adverse effects from herbicide exposure anticipated and implementation of the proposed action would not measurably contribute to any other past, on-going or foreseeable future activity and result in adverse effects to the yellow-billed cuckoo.

Summary and Determination

Yellow-billed cuckoos have not been documented within the project area, although suitable habitat exists. Based on the above analysis and the following rationale, a No Effect determination is made for the yellow-billed cuckoo.

- Breeding yellow-billed cuckoos have not been documented within the project area.
- Only one percent of the suitable project area habitat is proposed for treatment.
- Should breeding occur in the future, project design features would ensure that breeding birds are not adversely affected.
- Any disturbance to migrating birds would be short-term.
- At proposed application rates and with implementation of pdfs, there are no adverse effects from herbicide exposure anticipated.

Proposed actions would reduce the spread of invasive plants into riparian vegetation and help to maintain native habitat

Effects to Forest Service Sensitive Species

This section discusses effects on Forest Service sensitive species, including an analysis of treatment effects and herbicide exposure. Based on the analysis presented, a determination for each species is made, which are summarized in table 23.

Table 23: Sensitive Species determinations and rationale

Species	Action Alternative Determination	Rationale
Gray Wolf	MIIH[1]	Unlikely to be present in treatment areas. Future den and rendezvous sites protected.
Pygmy Rabbit	MIIH[1]	Not documented within the project area and unlikely to be present in treatment areas. Project design features minimize potential effects from herbicide exposure and treatment. Treatment would promote native habitat.

Species	Action Alternative Determination	Rationale
Townsend's Big-eared Bat	No Impact	Not present during treatment. Due to foraging behavior and with implementation of pdf's no adverse effects from herbicide exposure are anticipated.
Pallid Bat	No Impact	Not present during treatment. Due to foraging behavior and with implementation of pdf's no adverse effects from herbicide exposure are anticipated.
Fringed Myotis	No Impact	Not present during treatment. Due to foraging behavior and with implementation of pdf's no adverse effects from herbicide exposure are anticipated.
Bald eagle	No Impact	Few invasive plant acres near suitable nesting, foraging or roost habitat. Project design features effectively reduce potential impacts to nesting or roosting birds. At proposed application rates and methods, no adverse effects from herbicide exposure are anticipated.
American peregrine falcon	No Impact	No known nests within the project area. Project design features effectively reduce potential impacts to nesting birds. At proposed application rates and methods, no adverse effects from herbicide exposure are anticipated.
Grasshopper Sparrow	No Impact	Not documented within the project area. Project design features restrict activities within occupied habitat and make herbicide exposure unlikely. Suitable habitat maintained.
Wallowa Rosy Finch	No Impact	Not present in treatment areas. Suitable habitat not proposed for treatment.
Greater sage grouse	MIIH[1]	Nesting not documented within the project area. Project design features restrict activities to breeding birds and reduce the likelihood of disturbance or herbicide exposure. Suitable habitat maintained.
Bufflehead	No Impact	Not present in treatment areas. Project design features make herbicide exposure highly unlikely. Suitable habitat maintained.
Upland sandpiper	MIIH[1]	Nesting not recently documented on the Forest. Project design features reduce treatment and herbicide exposure effects within occupied habitat. Suitable habitat maintained.
Bobolink	No Impact	Not documented within the project area. Project design features minimize potential for effects and make herbicide exposure highly unlikely. Suitable habitat maintained.
Lewis' and white-headed woodpeckers.	MIIH[1]	Nest habitat would not be affected. Foraging behavior and project design features make herbicide exposure unlikely. Low likelihood of disturbance.
Columbia spotted frog	MIIH[1]	Low likelihood of disturbance. Project design features restrict treatment in suitable breeding habitat and make herbicide exposure unlikely. Suitable breeding habitat maintained.
Shortface lanx	No Impact	Not present in treatment areas.
Johnson's hairstreak	No Impact	Not present in treatment areas.

Species	Action Alternative Determination	Rationale
Silver-bordered fritillary	MIIH[1]	Occurrence within the project area is unlikely. Project design features restrict treatment within occupied habitat and make herbicide exposure unlikely. Suitable habitat maintained.
Haney basin duskysnail	MIIH[1]	Not present in treatment areas. Project design features protect future sites and make herbicide exposure highly unlikely.
Columbia clubtail	No Impact	Not documented in the project area. Project design features restrict treatment within breeding habitat and herbicide exposure highly unlikely.

1 – MIIH – May impact individuals or habitat (MIIH), but are not likely to lead to a trend toward federal listing”

Gray Wolf

Direct and Indirect Effects

Treatment

No known denning or rendezvous sites on or near the MNF. While no packs have become established on the MNF, transient individual may occasionally travel through looking for new territory or mates. Thus the potential for wolves to become established on the project area exists.

Direct effects from invasive plant treatment include disturbance caused by noise, people and vehicles. However, invasive plant projects involve very short-term disturbance with few people and might only be repeated once in the same growing season. Although wolves will travel over large distances, they are most likely to occur in wilderness and roadless areas, away from human disturbance. These areas tend to have minimal invasive plant infestations so the likelihood of disturbance is low. Additionally project design features are in place that prevents invasive plant treatments from occurring in close proximity to den or rendezvous sites. As a result it is unlikely individual animals would be affected by treatment and if disturbance were to occur, it would be limited to short-term avoidance by foraging or transient individuals.

While proposed treatments would help maintain habitat for elk, deer or other prey species, there would be little change in gray wolf habitat.

Herbicides

None of the proposed herbicides would result in an acute exposure that exceeds the toxicity index, however chronic exposures to carnivores could occur at the typical and highest application rate with triclopyr or at the highest application rate for picloram. A Malheur National Forest LRMP standard limits triclopyr to selective applications (no broadcast), whereas pdf F2, restricts application of picloram and triclopyr to typical application rates (or less for triclopyr). Use and frequency of picloram is also restricted with pdfs H3 and H4. As a result and considering that there are few treatments proposed in preferred wolf habitat, and that wolves forage over large areas and would not forage exclusively on contaminated prey; there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Anticipated activities could result in disturbance to wolves, although with implementation of pdf J1-a, any future den and rendezvous sites would be protected. So while future treatments could result in disturbance to foraging or transient individuals, effects would be short term and limited to a few days at any site. Also 88 percent of the proposed activities occur close to open roads, which would be avoided by wolves. Finally many of the future management actions (e.g. harvest, and burning) would be expected to maintain or improve big game habitat through aspen restoration and increases in forage on both summer and winter range. As a result and considering adverse effects from herbicide exposure are not anticipated, none of the alternatives would measurably contribute to any other past, on-going or foreseeable future activity and result in significant effects to the wolf.

Summary and Determination

To date gray wolves have not been confirmed on the MNF, although use is likely and it is possible that short-term disturbance could occur due to proposed treatments. As a result, and based on the above analysis and the following rationale, implementation of Alternatives B through D "**may impact individuals or habitat (MIIH), but are not likely to lead to a trend toward federal listing" the gray wolf.**

- Project Design Features would prevent disturbance to any den or rendezvous sites established on the MNF.
- At proposed application rates and with implementation of Regional Standards and pdfs, there are no adverse effects from herbicide exposure anticipated.
- Invasive plants and invasive plant treatments are less likely to occur in preferred remote habitat.
- Any disturbance from invasive plant treatment would be short-term in nature.
- Treatment would help maintain native plant communities and preferred big game habitat.

Pygmy Rabbit

Direct and Indirect Effects

Treatment

Pygmy rabbits are not known to occur on the project area. Should rabbits occupy the forest in the future, all proposed treatments have the potential to result in disturbance during implementation. Because less mobile young would be in burrows underground there is no direct mortality anticipated. With implementation of pdf J-6c, the timing, location and method of treatment be coordinated with a biologist in suspected use areas and any direct effects would be limited to short-term disturbance during treatment.

Loss of habitat for the pygmy rabbit could occur with expansion of invasive plants on rangelands (Weiss and Verts 1984), therefore, proposed invasive plant treatments would result in a beneficial effect to pygmy rabbit habitat by reducing the future spread of invasive plants and a possible loss of habitat.

Herbicides

Exposures of concern could occur at the typical and highest application rates for picloram and triclopyr and at the highest application of glyphosate. The likelihood of exposure is reduced with implementation of the LRMP standard that restricts use of triclopyr to selective techniques, with pdf F2 that restricts glyphosate to typical application rates, and with implementation of pdf's that restrict use of picloram to certain soil types (H3) and restrict use to a single application on any area within two calendar years (H4). Finally within occupied habitat treatment type and timing would be modified and activities would be restricted to manual techniques (J6-a). As a result there are no adverse effects from herbicide exposure anticipated.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Because of the small size of their home range (Heady and Laundre 2005), it is unlikely they would be affected by herbicide treatment on lands of other ownerships as well as NFS lands. Most of the treatments identified in table 20 occur in forested stands or on unsuitable pygmy rabbit habitat, although continued grazing and allotment improvements, could affect this species. As described under alternative effects, allotments are managed to prevent invasive plant introduction, grazing use is not expected to change, and livestock will be deferred following treatment if necessary to promote restoration of native vegetation. As a result and considering that proposed activities would maintain suitable habitat, none of the alternatives would measurably contribute to any other past, on-going or foreseeable future activity and result in significant effects to the pygmy rabbit.

Summary and Determination

The pygmy rabbit has not been documented on the forest. While short term effects from treatment are possible should they become established in the future, based on the above analysis and the following rationale, implementation **"may impact individuals or habitat"** **(MIIH), but are not likely to lead to a trend toward federal listing."** for the pygmy rabbit.

- First year treatment would only affect 10 acres of suitable habitat
- Pygmy rabbits have not been documented in the project area.
- Should use on the forest occur in the future, project design features would modify treatment if necessary to reduce potential impacts.
- Proposed treatments would contain or control invasive weed infestations and help to maintain native sagebrush habitat over the long-term.

Townsend's Big-eared Bat, Pallid Bat and Fringed Myotis

Direct and Indirect Effects

Treatment

While suitable habitat would be treated across the Forest, because bats either roost in structures or in the recessed crevices in snags during the day, and forage at a time when treatment would not occur, the likelihood that a bat would be affected by treatment is remote.

Herbicides

Acute exposures of concern to insectivorous mammals could occur with use of picloram or glyphosate at the highest application rate. Because neither herbicide would be broadcast sprayed above the typical application rate, no adverse acute exposure would occur. Chronic exposures from these herbicides could occur at the typical and highest application rate, although effects are greatly reduced when you consider 1) neither is a first choice herbicide under alternatives B and

C, 2) under alternative D picloram would only be broadcast sprayed as a first choice herbicide on 36 acres, 3) triclopyr is restricted to selective techniques and 4) pdfs F2, H3 and H4 all restrict use of picloram. As a result and considering bat foraging behavior (i.e., forage over large areas in a single evening) essentially eliminates the possibility that bats would consume nothing but contaminated prey for 30 days, there are no adverse effects from herbicide exposure anticipated.

Cumulative Effects

Anticipated cumulative effects are discussed by alternative above and include increased exposure to herbicides on other land ownerships and reduction of suitable foraging habitat due future timber harvest. As discussed above, less than 1 percent of the watersheds where future treatments would occur are proposed for management. Proposed activities would not modify suitable bat habitat and unaffected habitat would be available within all affected watersheds. As a result, and considering that bats forage over large areas and would not be exposed to toxic levels of herbicides, none of the alternatives would measurably contribute to any other past, on-going or foreseeable future activity and result in significant effects to the pallid bat, fringed myotis or Townsend's big-eared bat.

Summary and Determination

All alternatives would treat invasive plants in suitable bat habitat. However roosting bats would be unaffected and it is unlikely foraging bats would occur in treatment sites or be adversely affected by herbicides. As a result implementation of the action alternatives would have **No Impact** on the pallid bat, fringed myotis or on Townsend's big-eared bat.

Bald Eagle

Direct and Indirect Effects

Treatment

Bald eagles are sensitive to human disturbance during the breeding season, particularly within sight distance of nest sites. Consequently human and vehicle presence can cause the birds to leave nests or stay away from the nest long enough to have detrimental effects to eggs or young (USDI FWS 1986). Mechanical methods are more likely to cause effects at greater distances than other treatment methods, because machinery creates louder noise than other methods.

While there are three acres of treatment proposed within winter roost habitat and nine acres fall within one-half mile of an eagle nest, implementation of the following pdfs would reduce or eliminate noise and disturbance to nesting, roosting and foraging eagles.

- Pdf J2a – Invasive plant treatments would not occur within 0.25 miles during the nesting season (January 1st through August 31st).
- Pdf J2b – Activities above ambient levels would not occur between October 31st and March 31st during early morning or late afternoon near known winter roosts and concentrated foraging areas. Distance to daytime foraging areas would also be avoided.

With implementation of these pdfs there are no direct impacts to eagle nests or reproduction anticipated. While disturbance to roosting or foraging eagles is possible, given the small amount of land along waterbodies proposed for treatment (67 acres), the likelihood of disturbance is remote.

Herbicides

The results of exposure scenarios indicate that no herbicide or surfactant proposed for use poses a plausible risk to birds from eating contaminated fish. All expected doses to fish-eating birds for all herbicides are well below any known no-observable-adverse-effect-level (NOAEL) (see Appendix P of the R6 FEIS). Herbicide would not reach the upper canopies of mature trees where bald eagles nest and with implementation of pdf J2-a eagles would not be directly sprayed or encounter vegetation that has been sprayed. As a result there are no adverse effects from herbicide exposure anticipated.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Anticipated cumulative effects include possible herbicide exposure on multiple ownerships, disturbance from proposed future activities, or modification of nest habitat due to proposed timber harvest. All future activities would be in compliance with bald eagle and golden eagle management guidelines (USDI Fish and Wildlife Service 2007b) and no impacts to nesting birds or reproduction are anticipated. While it is possible that eagles could be exposed to herbicides on other ownerships, even if a bird fed for a lifetime upon fresh water fish that had been contaminated by an accidental spill of herbicide, they would not receive a dose that exceeded any known NOAEL. As a result, and considering that the risk of adverse effects from proposed treatment have been effectively eliminated through implementation of pdfs (J2-a and J2-b), no alternative would measurably contribute to any other past, on-going or future activity and result in significant effects to the bald eagle.

Summary and Determination

Invasive plant treatments are proposed in three acres of eagle winter roost habitat and on nine acres within one half mile of known nests. Based on the above analysis and the following rationale, implementation of the action alternatives will have **No Impact** to bald eagles:

- Implementation of project design features would effectively eliminate the likelihood that nesting or winter roosting eagles would be affected by disturbance associated with invasive plant treatment.
- Invasive plant treatments will not result in the removal of bald eagle nests or roost trees, or affect foraging habitat.
- With implementation of pdfs there are no adverse effects to eagles from herbicide exposure anticipated.
- Projects conducted that are more than a quarter mile from a nest, or a half mile line of sight distance from a nest, and do not result in the modification of eagle habitat, or result in noise above ambient levels, should have no effect on bald eagles (FWS 2003a).

American Peregrine Falcon

Direct and Indirect Effects

Treatment

While suitable habitat exists, there are no known peregrine falcon nests on the Forest. Because peregrine falcons nest on cliffs away from any known invasive plants, future nests would not be impacted by any of the proposed treatments. The following pdfs were designed to reduce the possibility that nesting birds or their young would be affected by proposed activities:

- J3- a - Seasonal restrictions, which are based on elevation and proximity to the nest will be applied near known nests sites and will be implemented until at least two weeks after all young have fledged, including;
    - J3-b – All invasive plant treatments would be restricted within 0.5 miles of peregrine falcon nest during the nesting season (based on J3-a).
    - J3-c – Invasive plant treatments involving motorized equipment or vehicles would be seasonally prohibited between 0.5 miles and 1.5 miles of known nests during the nesting season (based on J3-a).
    - J3-d- Non-mechanized or low disturbance invasive plant activities may occur between 0.5 miles and 1.5 miles of known nests during the nesting season, but would be coordinated with a wildlife biologist to identify mitigation measures, if necessary.

With implementation of the above pdfs there are no effects to nesting birds or their young from proposed treatments anticipated. Also due to the small amount of habitat proposed for treatment and widespread availability of unaffected habitat, the likelihood that foraging birds would be affected is remote.

Herbicides

There is no quantitative scenario for a predatory bird that eats primarily other birds, such as the peregrine falcon, so the “fish eating bird” and “mammal eating bird” were used as surrogate scenarios. The fish eating bird scenario likely overestimates the dose to the peregrine falcon because the hypothetical fish consumed are from a pond contaminated by a large spill of herbicide. These hypothetical fish likely have higher concentrations of herbicide in their bodies (and thus a higher dose to the predatory bird) than would a small bird that incidentally ingested herbicide before it was preyed upon. Also, the small mammal in the “mammal-eating bird scenario” is directly sprayed

It would be practically impossible to directly spray a bird that a peregrine falcon would then immediately prey upon. Except for triclopyr (small mammal scenario), which cannot be broadcast sprayed, no herbicide dose exceeded the toxicity indices for fish-eating or mammal-eating birds even at highest application rates. As a result there are no adverse effects from herbicide exposure are anticipated.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. It is not expected that future treatments would adversely affect nest sites, although disturbance to foraging birds could occur. With implementation of pdfs (J3-a through J3-e) proposed treatments would not adversely affect nesting birds, although as described above, effects include possible herbicide exposure on lands of other ownerships. Also hexachlorobenzene (HCB), the contaminant in picloram (alternative D), and to a lesser extent clopyralid, does bio-accumulate in animal tissue; however it is present in very small amounts (picloram, 8 parts per million and clopyralid, less than 2.5 parts per million). The risk of bio-accumulation of HCB from picloram and clopyralid use is therefore very low. The R6 2005 FEIS states that HCB is a ubiquitous and persistent chemical in the environment and the amount released from Forest Service use would be inconsequential in comparison to existing background levels and annual releases from manufacturing. However, use of picloram and clopyralid in remote locations could constitute the primary source of HCB in those areas. Monitoring of peregrine falcons in the Pacific Northwest has revealed HCB in their blood samples, and peregrine populations in the Pacific Northwest appear to continue to be affected by contaminants, although not HCB specifically. Eggshell thinning induced by DDE, the metabolite of DDT, affect populations in the Pacific Northwest and elsewhere, and residual levels of DDE continue to be detected in some peregrines (Henny et al. 1996). Reproductive failure at peregrine nests has also occurred in Oregon due to eggshell thinning (Peterson 2006). However with implementation of pdf J3a-e the use of picloram and clopyralid within secondary nest zones would be restricted, whereas H3 and H4 restrict the use of picloram. As a result and because broadcast application is restricted to the typical application rate, the likelihood for HCB contamination is remote and discountable. Consequently and with implementation of pdfs that protect nest sites, none of the alternatives would measurably contribute to any other past, on-going or future activity and result in significant effects to the peregrine falcon.

Summary and Determination

There are currently no known nest sites on the Forest. Should a nest become established in the future, implementation of project design features would ensure that nesting peregrine falcons would be not be adversely affected by treatment or be exposed to toxic levels of herbicide. Implementation of the action alternatives would have **No Impact** to peregrine falcons.

Grasshopper Sparrow

Direct and Indirect Effects

Treatment

Grasshopper sparrows are not known to occur within the project area. Should they become established in the future, pdf J9-a restricts treatment within occupied habitat and there are no impacts to nesting birds or young anticipated. Because of the small amount of habitat proposed for first year treatment (71 acres), it is unlikely that foraging or migrating birds would be affected.

Invasive plants can adversely affect habitat for some grassland birds such as the grasshopper sparrow (Scheiman et al 2003). Treatments under the action alternatives would help to contain or control existing as well as future infestations and maintain native grassland habitat.

Herbicides

Risk of effects from herbicide exposure was evaluated using the insectivorous bird scenario. For an acute exposure at typical and highest application rates, triclopyr exceeded a dose of concern, whereas glyphosate exceeded the NOAEL at the highest application rate. Data was lacking to evaluate a chronic exposure of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl, and triclopyr on small birds consuming insects. The likelihood of exposure is reduced with implementation of the Malheur National Forest LRMP standard that restricts use of triclopyr to spot techniques only, pdf F2 that restricts broadcast application of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl and triclopyr to typical application rates, and pdfs H3/H4 that restrict the frequency and use of picloram. With implementation of these design features and considering the small size and scattered nature of proposed treatments sites (scattered across 40 watersheds), it is highly unlikely that a bird would receive an acute or chronic exposure. As a result there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. With the exception of continued grazing and water development, there are few on-going/future management activities that would occur within suitable grasshopper sparrow habitat. As described under the alternative effects, grazing use is not expected to change, grazing will be deferred following invasive weed treatments until native vegetation is established and continued grazing is not expected to reduce grassland habitat. While individuals could be exposed to herbicides applied on lands of other ownerships, due to the small and scattered nature of treatment sites and small amount of habitat proposed for treatment, it is unlikely a bird would receive multiple exposures. As a result, and considering treatment would not occur within occupied habitat during the nesting season, none of the alternatives would measurably contribute to any other past, on-going or future activity and result in significant effects to the grasshopper sparrow.

Summary and Determination

Proposed treatment would contain and control existing and future infestations of invasive plants and help maintain native grassland communities and suitable grasshopper sparrow habitat over the long-term. While suitable grasshopper sparrow habitat is proposed for treatment, nesting has not been documented on the forest and project design features are in place that restricts treatment within occupied habitat should they become established in the future. Consequently implementation of the action alternatives would have **No Impact** on the grasshopper sparrow**.**

Wallowa Rosy Finch

Direct, Indirect and Cumulative Effects

The Wallowa rosy finch occupies upper elevation sites away from primary invasive weed vectors. As a result there are no treatments proposed within suitable habitat and it is unlikely they would be affected by future treatments, thus there are no direct, indirect or cumulative effects from treatment anticipated under any alternative.

Summary and Determination

The Wallowa rosy finch has not been documented on the Forest and it is unlikely that high elevation habitat would be affected by invasive plants, or treatment. As a result implementation of the action alternatives would have **No Impact** to this species.

Greater Sage Grouse

Direct and Indirect Effects

Treatment

While there are no known leks or brood rearing habitat on the MNF, sage grouse use are known to use the project area. Documentation of sage grouse in the project area is incidental and scattered. About 79 acres of mapped infestations are within the 139,500 acres of suitable habitat for sage grouse within the project area.

Sage grouse are sensitive to disturbance caused by noise, people and vehicles. All treatment methods could cause some disturbance to sage grouse. Should a lek be discovered any time during the life of the project, the following project design features would reduce adverse impacts to nesting birds.

- Pdf J4-b - Human activities within 0.3 mile of leks will be prohibited from the period of one hour before sunrise until four hours after sunrise and one hour before sunset until one hour after sunset from February 15 – May 15.

- Pdf J4-c - Do no conduct any vegetation treatments or improvement projects in breeding habitats from February 15 – June 30.

With implementation of these pdfs and considering the marginal nature of sage grouse breeding habitat on NFS lands, no effects to breeding birds or reproduction are expected.

Disturbance to foraging birds could occur, but due to the small size and widely scattered nature of treatment sites and widespread availability of adjacent unaffected habitat, disturbance effects would be minimal and short-term (one day). Sage grouse would likely avoid the site during treatment.

Loss of habitat for sage grouse habitat by invasive plant expansion on rangelands can occur (Connelly et al. 2000). Because all action alternatives allow treatment of existing and future invasive plant infestations, native sagebrush communities and suitable sage grouse habitat would be maintained over the long-term.

Herbicides

Because adult sage grouse consume vegetation and chicks rely heavily on insects, herbicide exposure was evaluated using a large vegetation eating bird, as well as a small bird consuming insects.

For adult birds and chicks at typical application rates, only triclopyr (if broadcast sprayed) exceeded the acute toxicity thresholds, whereas glyphosate exceeded a dose of concern at the highest rate for small birds consuming insects. A Malheur National Forest LRMP standard restricts application to triclopyr to selective techniques or spot treatment, whereas pdf F2 limits glyphosate broadcast and all use of triclopyr to typical rates or less per acre. As a result it is unlikely adult birds or chicks would receive an acute exposure of concern.

Chronic exposures were also evaluated for large birds consuming vegetation and triclopyr exceeded a dose of concern at typical and highest application rates, whereas sethoxydim, sulfometuron methyl, and glyphosate exceeded the toxicity threshold at the highest application rate. Data is lacking to evaluate a chronic exposure of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl and triclopyr on small birds consuming insects. While exposure from these herbicides/surfactants are possible, when you consider that; 1) pdf F2 restricts broadcast application of clopyralid, glyphosate, picloram, sethoxydim and sulfometuron methyl to typical application rates (and all use of triclopyr to typical rates) per acre, 2) triclopyr is restricted to spot techniques, 3) Only 79 acres of invasive plant treatment are proposed in suitable habitat and sites are small and scattered across 20 watersheds, and 4) the use of the project area by sage grouse is scattered and incidental, it is unlikely that birds would consume 100 percent of their diet from contaminated insects/vegetation for 90 days and receive a chronic dose of concern. As a result, there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Other than continued grazing and water development, there are few future management activities anticipated within suitable sage grouse habitat. On NFS lands, range administration adjustments such as changes in livestock movement patterns, alterations of season of use, adherence to allowable use standards and delayed re-introduction following wildfire would be used to reduce grazing impacts. As a result and considering that passive restoration may include keeping cattle away from treated areas until the area recovers with native vegetation, it is expected that grassland habitat would be maintained following treatment.

Because suitable habitat occurs on NFS lands, as well as adjacent private and BLM lands, potential cumulative effects include possible herbicide exposure or disturbance on all ownerships. Due to the small amount of habitat proposed for treatment, treatment restrictions within breeding habitat, and reduced risk of herbicide exposure, none of the alternatives would measurably contribute to any other past, on-going or future activity and result in significant effects to sage grouse.

Summary and Determination

While no sage grouse leks have been documented on the project area, use has been documented and birds could be affected by treatment. Based on the above analysis and the following rationale, implementation of the action alternatives "**may impact individuals or habitat" (MIIH), but are not likely to lead to a trend toward federal listing**."

- There are no sage grouse leks known to occur on the MNF and NFS lands do not provide quality nesting habitat similar to that on adjacent lands. Should a lek be established in the future, pdfs would restrict treatment during the nesting season.
- Sage grouse would not be exposed to toxic levels of herbicides.
- Disturbance related effects to grouse will be short-term in nature and unaffected habitat is available.
- Proposed treatment would contain and control existing and future infestations of invasive plants and help maintain native sagebrush habitat required by sage grouse.

Bufflehead

Direct and Indirect Effects

Treatment

Because they rarely breed in Oregon, nest in tree cavities and considering the small amount of habitat proposed for first year treatments, there are no direct effects from treatment anticipated.

Herbicides

These ducks eat aquatic invertebrates and fish, so risk from herbicide exposure was evaluated using a "fish-eating bird" scenario. Based on available data, no herbicide exceeded a dose of concern for any exposure (acute or chronic) at any application rate. As a result no adverse effects from herbicide exposure are anticipated under any alternative.

Cumulative Effects

Because there are no direct or indirect effects associated with treatment, none of the alternatives would measurably contribute to any other past, on-going or future activity and result in significant effects to bufflehead.

Summary and Determination

Buffleheads have not been documented breeding within the project area and are unlikely to occur within treatment sites. As a result and considering that none of the herbicides or surfactants exceeded a dose of concern, implementation of the action alternatives would have **No Impact** to the Bufflehead.

Upland Sandpiper

Direct and Indirect Effects

Treatment

Approximately 79,000 acres of potentially suitable upland sandpiper habitat occurs on the MNF and of this, 72 acres are currently known to contain invasive plants. Broadcast application of herbicides would occur on 50 percent and 25 percent of these sites under Alternatives B and D respectively, whereas manual/mechanical treatments would occur on 68 percent of these sites under Alternative C.

Potential effects of invasive plant treatment on upland sandpipers are mainly associated with disturbance that may occur during the nesting season caused by noise, people and vehicles. If birds were to be in the immediate vicinity of treatment, they could be temporarily displaced. Also the cryptic nests of upland sandpipers are susceptible to crushing or trampling by people or vehicles. In order to reduce the likelihood that nests, eggs our young are harmed, the following design feature would be implemented:

- Pdf J8-a - No treatment would occur on sites that have historic or recent documentation of upland sandpipers during the nesting season (April 1st to August 1st), unless the site has been surveyed and no nesting is occurring.

While all action alternatives would reduce invasive weeds, Alternative B would provide the most effective control of invasive plants and maintenance of suitable grassland habitat.

With implementation of the above pdf, no impacts to nesting birds or their young are anticipated. Minor, short-term disturbance to foraging birds outside the nesting season are possible.

Herbicides

Effects of herbicides are the same as those described under grasshopper sparrow and there are no adverse effects anticipated under any alternative**.**

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. With the exception of continued grazing and water development, there are few future management activities that would occur within suitable upland sandpiper habitat. As described under the alternative effects, grazing use is not expected to change, grazing will be deferred following invasive weed treatments until native vegetation is established and continued grazing is not expected to reduce wildlife cover and forage or upland sandpiper habitat. While they could be exposed to herbicides applied on lands of other ownerships, due to the small and scattered nature of treatment sites and small amount of habitat proposed for treatment, it is unlikely a bird would receive multiple exposures. As a result, and considering treatment would not occur within occupied nest habitat, none of the alternatives would measurably contribute to any other past, on-going or future activity and result in significant effects to the upland sandpiper.

Summary and Determination

While upland sandpipers have not been documented breeding on the MNF, use on adjacent private lands does occur and use of suitable habitat on the MNF is possible. Based on the above analysis and the following rationale, implementation of the action alternatives "**may impact individuals or habitat" (MIIH), but are not likely to lead to a trend toward federal listing**."

- Breeding upland sandpipers have not been documented on the MNF.
- Should a nest be documented, project design features are in place that restricts treatment during the breeding season.
- Given the type of herbicides proposed and with implementation of pdfs, none of the alternatives are expected to result in adverse effects from herbicide exposure.

Lewis and White-Headed Woodpeckers

Direct and Indirect Effects

Treatment

Approximately 10 acres of suitable white-headed woodpecker habitat and 275 acres of Lewis's woodpecker habitat are proposed for treatment. Because no snags or trees would be removed nest habitat would be unaffected. Foraging birds, particularly the Lewis' woodpecker which frequently forages on the ground could be affected by the noise and disturbance associated with herbicide or non-herbicide treatments under all alternatives. Because both species forage over large areas and considering the availability of unaffected habitat, direct effects would be limited to short-term disturbance at the treatment site.

Herbicides

At typical application rates triclopyr could pose an acute risk to birds eating insects. Glyphosate poses an acute risk at the highest application rate, whereas data is lacking to fully assess chronic exposures of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl, and triclopyr on small birds consuming insects. Broadcast application of triclopyr is restricted to spot techniques, whereas pdf F2 limits broadcast application of clopyralid, glyphosate, picloram, sethoxydim and sulfometuron methyl, and all use of triclopyr to typical application rates or less. As a result, the likelihood that a bird would be exposed to toxic levels of herbicide is reduced.

The likelihood of exposure is further reduced when you consider that birds forage over large areas and that many of the insects utilized occur within dead wood, under bark or are taken from areas not exposed to herbicides. As a result birds are not likely to consume an entire day's diet of contaminated insects (acute exposure) or forage exclusively on contaminated insects for 90 days (chronic exposure) and there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. These species could be affected by any activity that reduces snags or downed wood, or modifies the overstory, particularly timber harvest and prescribed burning. As discussed above, timber harvest and invasive plant treatments would occur within 39 watersheds, which include approximately 1,100 acres of treatment. While timber harvest would reduce habitat for some species due to reductions in the overstory, with implementation of Forest standards, a component of snags and downed wood would be retained on all sites. Proposed treatments would not reduce suitable habitat. As a result, and considering the low risk of herbicide exposure, none of the alternatives would measurably contribute to any other past, current or foreseeable activity and there are no significant cumulative effects to snag- or downed-wood- dependent species anticipated.

Summary and Determination

Lewis Woodpecker and White-headed Woodpecker – Approximately 275 acres of suitable Lewis woodpecker habitat and 10 acres of suitable white-headed woodpecker habitat is proposed for first year treatment. No direct effects to nesting birds or reproduction are anticipated and suitable habitat would be unchanged. Because treatment could result in short-term disturbance to foraging birds, implementation of the action alternatives **may impact individuals or habitat**" **(MIIH), but are not likely to lead to a trend toward federal listing".**

Columbia Spotted Frog

Direct and Indirect Effects

Treatment

Invasive plants have been mapped within 52 acres of suitable breeding habitat. Broadcast application of herbicides is proposed on 23 and 4 acres under alternatives B and D respectively, whereas 48 acres of manual treatment would occur under alternative C.

Adult frogs, eggs, and larvae are not likely to be disturbed by invasive plant treatments during the breeding season because they are restricted to aquatic habitat. After breeding however, adults will disperse into adjacent wetland and riparian/upland habitats utilized by frogs. While trampling and direct mortality could occur under all alternatives, with implementation of pdf J5-a, when working in occupied habitat, treatment methods, timing and location be coordinated with a biologist prior to implementation. As a result, and considering that frogs are less likely to inhabit areas infested with invasive plants, the likelihood of mortality or short-term disturbance is low.

Herbicides

Data on herbicide effects to amphibians is limited. There is some data to suggest that amphibians may be as sensitive to herbicides as fish (Berrill et al. 1994, Berrill et al. 1997, Perkins et al. 2000), so for the this analysis herbicides that pose potential risk to federally listed fish (as determined by the quantitative estimates from exposure scenarios) will also be considered to pose a risk to amphibians. Results from exposure scenarios indicate that aminopyralid, chlorsulfuron, clopyralid, imazapic, imazapyr, metsulfuron methyl and picloram pose a very low risk to amphibians. Data is insufficient to evaluate risk of sub-lethal effects. The Poast□ formulation of sethoxydim is much more toxic to aquatic species than is technical grade sethoxydim. However, use of Poast□ is unlikely to result in concentrations in the water that would result in toxic effects to aquatic species (SERA 2001). There is a substantial limitation to this risk characterization because there are no chronic toxicity studies on aquatic animals available for either sethoxydim or

Poast. However, for the types of herbicide applications proposed in this analysis, the R6 Invasive Plant BA (USFS 2005) demonstrated that chronic exposures of concern to aquatic species are not possible

Triclopyr comes in two forms; triclopyr BEE and triclopyr TEA. Triclopyr BEE is much more toxic to aquatic organisms than is triclopyr TEA. Triclopyr cannot be broadcast sprayed, regardless of alternative, because of a standard added to the LRMP by the R6 2005 ROD. At typical application rates, neither version is likely to result in adverse effects to amphibians, using a sub-lethal effect for tadpole responsiveness as a threshold of concern. At the highest application rate analyzed, tadpole responsiveness could be reduced. However, the highest application rate analyzed exceeds that which is legally permitted on the herbicide label, so this rate could not be applied. Also, the concentrations of concern are not likely to occur from applications in the proposed action due to the restriction on broadcast spraying.

Triclopyr also has an environmental metabolite known as TCP (3,5,6-trichloro-2-pyridinol). TCP is about as acutely toxic to aquatic species as triclopyr BEE (SERA 2003 Triclopyr). Adverse effects to aquatic species from TCP are likely only if triclopyr is applied at the highest application rates. These rates are highly unlikely because triclopyr is restricted to spot techniques.

The likelihood of exposing amphibians also depends on the application method, habitat treated, and season of application. Although potential for exposure exist, adverse effects to amphibians are further reduced by implementation of pdfs that restrict herbicide application rates, restrict use of moderate to high risk herbicides and require herbicide-use buffers. More specifically; 1) project design features (F1, F2, H1, H2, H5, and H8-H10) reduce the likelihood for herbicides to be delivered to waterways in a concentration of concern, 2) herbicide restrictions on certain soil types (H3 and H6) reduce potential for runoff and leaching, 3) restrictions on extent of treatment in a given site (H4, H5 and H7) ensure that herbicides would not be delivered in amounts greater than the SERA risk assessment scenarios and that unsprayed areas will be retained to provide refugia, 4) Herbicide use buffers have been modified to include roadside ditches that are hydrologically connected to streams, when surface water is present in the ditch, 5) spills are extremely unlikely to occur given the many safety precautions in place and 6) when working within occupied or suitable spotted habitat, use of herbicides that pose a risk would be restricted and that the treatment methods, timing and location be coordinated with a wildlife biologist. Collectively these pdfs in combination with the use of low risk first year/first choice herbicides make it unlikely that the Columbia spotted frog would be adversely affected by herbicides.

Adult frogs could be dermally exposed to herbicides by moving through treated vegetation or soil. There is insufficient data to quantify the dose received from exposure to contaminated vegetation or soil, but it is likely to be much less than if the frog was in contaminated water and could easily absorb the solution through its skin. The likelihood of exposure is further reduced when you consider that the herbicide-use buffers restrict broadcast application of herbicides within breeding habitat, require that unsprayed areas be provided to serve as refugia for amphibians (H7 and H8) when treating lakes, ponds or wetlands, and restricts herbicide use nears wells, springs and stockponds (H9).

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. There would be few if any effects to breeding habitat from ongoing or future timber harvest, burning or fuel treatments and implementation of LRMP standards would ensure that breeding habitat is maintained during any construction, water development, or restoration projects. Disturbance from activities at upland sites from future activities or recreational use could occur. While proposed treatments could further disturb individuals, when working in occupied habitat, treatment methods, timing and location would be coordinated with a biologist prior to implementation (pdf J5-a) and modified if necessary to reduce potential impacts.

Due to their restricted movement, frogs are unlikely to be exposed to herbicides on multiple ownerships. Also as described under direct and indirect effects, with implementation of pdfs and herbicide use buffers that restrict moderate to higher risk herbicides, there are no adverse effects from herbicide exposure anticipated. As a result, none of the alternatives would measurably contribute to any other past, on-going or future activity and result in significant effects to the Columbia spotted frog.

Summary and Determination

Disturbance to Columbia spotted frog eggs, larvae, or adults during invasive plant treatment would be minor and short-term. Implementation of any action alternative "**may impact individuals or habitat" (MIIH), but are not likely to lead to a trend toward federal listing**. Because they are restricted to aquatic habitat, adult frogs, eggs, and larvae are not likely to be disturbed by invasive plant treatments during the breeding season. Due to the relatively low toxicity of most herbicides proposed, the low concentrations in water that would occur under normal operations, and implementation of pdfs, it is unlikely frogs, eggs or larvae would be exposed to toxic levels of herbicide. If occupied habitat is proposed for treatment, the site would be reviewed by a local biologist and treatment/methods modified if necessary to avoid adverse impacts. Because they are restricted to aquatic habitat, breeding adult frogs, eggs, and larvae are not likely to be disturbed by invasive plant treatments during the breeding season. Proposed treatment would contain and control existing and future infestations of invasive plants and help maintain riparian/wetland habitat.

Shortface Lanx and Harney Basin Duskysnail

Direct and Indirect Effects

Treatment

The shortface lanx is a non-migrant freshwater snail that can be found in the main channel of fast flowing streams and rivers, whereas the Harney basin duskysnail (HBD) inhabits cold springs and runs, as well as adjacent sagebrush habitat. Because it is aquatic and inhabits larger streams and rivers, there would be no mortality or disturbance to the shortface lanx.

There are no treatments proposed within the Spring Creek watershed that contains the only known documentation of the Harney basin duskysnail within the project area. While it is possible that a site could be affected in the future, with implementation of pdf J10-a and considering that treatment would not likely occur within a cold water spring habitat where this species would be found, it is not expected that the Harney basin duskysnail would be directly affected by treatment under any alternative.

- Pdf J10-a - If an occupied site is proposed for treatment, a local biologist would be consulted to determine protection measures, if necessary. These measures may include limitations on vehicle entry, modifications to treatment type or timing, or implementation of buffers.

Invasive plant treatments would not remove or alter habitat at the site, nor would treatments result in changes to the hydrologic regime. As a result suitable habitat would be unchanged.

Herbicides

Aquatic Mussels – There are limited data on herbicide effects to aquatic snails. Relyea (2005a) found no effect to three species of aquatic snails from the glyphosate formulation Roundup®. Mona et al. (2013) reported gene damage in aquatic snails exposed to 5 mg/L (ppm), but not 0.5 mg/L, glyphosate, presumably from the formulations used in Egypt mentioned in the paper. However, the Mona et al. paper does not specify if they used technical glyphosate alone, or the formulations mentioned. Given the numerous papers that attribute adverse effect of glyphosate-based formulations to the surfactants present (e.g. Relyea 2005b, Relyea 2012, Diamond and Durkin 1997) we cannot determine if the effects noted in Mona et al. are from glyphosate itself, or the formulation mixture with surfactants. Tate et al. (1997) reared three generations of aquatic snails in different sub-lethal concentrations of technical grade glyphosate. Glyphosate had little effect on the first and second generations, but for the third generation, growth rates of snail embryos and egg-laying capacity increased in the presence of glyphosate, while hatching was inhibited and some abnormalities were observed at 0.1 mg/L and higher. Griselia et al. (2004) tested imazapyr and a Brazilian formulation of Arsenal (which contains imazapyr and the surfactant nonylphenol ethoxylate) to find the LC50 to the aquatic snail *Biomphalaria tenagophila*. The LC50 of imazapyr was 45.9 mg/L and for Arsenal it was 20.1 mg/L. Back et al. (2012) looked at aquatic snail and algal assemblages in eutrophic wetland plots treated with glyphosate (Aqua-Neat®) or imazapyr (Habitat®). Glyphosate plots were erroneously treated with concentrations 6-times higher than approved label rates (Back et al. 2013). Eight species of snails were recovered from the plots. Diversity of snail species was similar across treated and untreated plots, while snail densities were higher in herbicide-treated plots. The higher snail densities in herbicide-treated plots were attributed to increase light availability creating higher algal growth. No negative impacts to snail species were reported.

The GLEAMS model was run on four sites within the project area that had the greatest potential for herbicide delivery to water near fish habitat. Results indicate that herbicide concentrations in the water are at least three orders of magnitude less than levels of concern for fish, amphibians and aquatic invertebrates (table 38, chapter 3.5.3). Very little herbicide would reach water, even in an unbuffered scenario. The greatest amount of herbicide reaching streams in the GLEAMS model results was 0.0011ppm (same as mg/l). This was for the herbicide imazapyr. The acute threshold of concern for this herbicide is 5 mg/l; several orders of magnitude larger than the expected peak concentration in water, even in the unbuffered, high risk sites.

Terrestrial Snails - There is limited data regarding herbicide toxicity to land snails – the few studies available are from studies conducted on brown garden snails (*Helix aspersa*) exposed to picloram and glyphosate. In Schuytema et al. (1994), snails were fed food contaminated with the herbicides at concentration up to 5000 mg/kg for 14 days. Neither glyphosate nor picloram appeared to pose a risk to the snail. The effect on hatching success and embryo development of *H. aspersa* snail eggs was tested for glyphosate, a European formulations of Roundup®, and a commercial nonylphenol polyethoxylate (NPE) surfactant (Agral®) (Druart, et al. 2010). After 14 days of exposure, hatching success for glyphosate alone was equivalent to controls, indicating that glyphosate itself had no effect. The formulation Roundup® completely inhibited hatching at 225 mg/l. Hatching response to NPE was quite variable, with EC50 (50% reduction in hatching success) ranging from 26 – 85 mg/l. Druart, et al. (2010) observed the embryo development of non-hatched eggs from the hatching success studies. They report that “embryos exposed to glyphosate were blocked late in their development…".This result is presumably from Roundup® since glyphosate itself did not alter hatching success.

Based on the limited data available, glyphosate and picloram do not appear to pose a risk to terrestrial snails. It appears unlikely that herbicides would pose serious toxic risk to terrestrial snails, but this conclusion of risk is made with the reservation that data is extremely limited. The likelihood is further reduced with implementation of pdf J10a, which restricts treatment within occupied Harney basin duskysnail habitat. With implementation of this pdf and considering there are no first-year treatments proposed near the Spring Creek site where this species has been documented there are no adverse effects from herbicide exposure to the Harney basin duskysnail anticipated.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Of the activities anticipated, few treatments within suitable habitat would occur. Also LRMP standards are in place to reduce potential impacts to streams, rivers and springs. While future grazing may adversely affect the Harney basin duskysnail or its habitat, as described under alternative effects, grazing use is not expected to change and upland and riparian habitat would be maintained. As a result and because proposed treatments would not alter existing habitat, or likely result in exposure to harmful levels of herbicide, none of the alternatives would measurably contribute to any other past, on-going or future activity and result in significant effects to these species.

Summary and Determination

Shortface Lanx – Based on the above analysis and the following rationale, there are no effects to the shortface lanx anticipated and implementation of alternatives B, C and D would have **No Impact** on this species.

- No effects of exposure have been noted in short-term exposures at concentrations predicted from the proposed project.
- If herbicide were to get into the water, contact time in flowing streams would be a matter of minutes, not hours or days, and certainly not for multiple generations of aquatic mollusks.
- No effects to aquatic snails (also a surrogate for herbicide effects to the mussel) were noted in generations 1 and 2.
- Glyphosate and imazapyr treatments in wetlands can increase aquatic snail populations and do no adversely affect food availability.
- Glyphosate is inactivated rather quickly by adsorption to soil and microbial breakdown in soil and water.
- The size and distribution of the invasive plant populations (relatively small and scattered), frequency of occurrence (patchy), environmental fate of glyphosate (not persistent), and size of the rivers in Hells Canyon (much larger than the modeled stream) make it impossible to achieve the predicted concentration over a period of 3 snail generations.
- There are very limited acres of invasive plants, relative to the uninfested land, adjacent to mussel and snail habitats, so only a small portion of the habitat would be treated.

Harney Basin Duskysnail – No treatments are proposed at the site where the Harney basin duskysnail has been documented and pdfs would modify treatment or timing if necessary should an occupied site be proposed for treatment in the future. As a result and considering herbicide use buffers would further protect spring and seeps, the action alternatives "**may impact individuals or habitat" (MIIH), but are not likely to lead to a trend toward federal listing** " for the Harney basis duskysnail.

Johnson Hairstreak

Direct, Indirect, Cumulative Effects and Determination

Johnson hairstreak has not been documented within suitable coniferous forest habitat within the project area and it is unlikely they would occur within treatment areas. Consequently there would be no direct, indirect or cumulative effects anticipated and implementation of the action alternatives would have **No Impact** on this species.

Silver-bordered Fritillary

Direct and Indirect Effects

Treatment

Of the approximately 22,000 acres of potentially suitable habitat, approximately 34 acres of riparian/wet meadow habitat are known to contain invasive plants and are proposed for treatment. These sites are generally small in size and scattered across 45 watersheds.

Mechanical, manual and herbicide treatment could harm eggs or larvae, due to physical disturbance on the site. In order to reduce potential impacts pdf J6-b requires that a local wildlife biologist be contacted if treatment is proposed on sites where the silver-bordered fritillary has been documented. Since the butterfly populations fluctuate wildly among meadows and between years, the local biologist can provide advice on where to prioritize treatments and to modify timing/treatment methods if necessary to reduce impacts. Consequently the potential for adverse effects would be reduced. With implementation of this pdf and considering the small amount of habitat proposed for treatment, it is unlikely that treatments would directly affect the silver-bordered fritillary.

The silver-bordered fritillary is dependent upon maintenance of wet meadow habitat and invasive plants can reduce the abundance and/or cover of larval food plants as well as nectar plants (violet). As a result all alternatives would help to promote native plant communities and help sustain silver-bordered fritillary habitat over the long-term.

Herbicides

Data on herbicide effects to butterflies is limited. There are a few studies in peer-reviewed literature. Where data is lacking, risk assessments rely on data from the honeybee and other insects as a surrogate.

Herbicides could affect butterflies directly, or through affects to adult nectar plants or caterpillar host plants. Russell and Schultz (2009) tested the toxicity of sethoxydim (in the formulation Poast®) to the larvae of Puget blue butterfly (*Icaricia icarioides blackmorei*), a Washington species of concern, and the non-native small white or cabbage white butterfly (*Pieris rapae*). Larvae were directly sprayed and also fed on sprayed food plants, mimicking a spring application.

It should be noted that Poast® contains a petroleum solvent, which could be an important factor in the toxicity results. Due to issues with the exposure methodology for the cabbage white butterfly (larvae were placed in plastic cups and sprayed, which would create pooling of liquid around larvae and prevented foliar interception), and because it is a non-native species, results discussed here will focus on results for the native Puget blue. Poast® did not alter percent survival of larvae, biomass of pupae, adult biomass, or morphological characteristics, but did cause earlier emergence from the pupae, and adults had smaller wing sizes. The effects of the sethoxydim formulation to the Puget blue butterfly were all sublethal effects (Russell and Schutlz 2009). The authors suggest that applications made in late summer and fall would reduce effects to species like the Puget blue which stop feeding in summer and when larvae retreat to ground litter.

Labar (2009) conducted a field study on effects of sethoxydim used on a Washington prairie to the Puget blue butterfly. Plots were sprayed with Poast® mixed with the surfactant Agridex® in April of 2007 and 2008. Results of the field trial indicated the herbicide had very little to no impact on larval survival, flower species, or Puget blue oviposition, while adult butterflies spent significantly less time in sprayed plots than in controls. Labar (2009) also recorded habitat use of sprayed and unsprayed plots for silvery blue (*Glaucopsyche lygdamus*), ochre ringlet (*Coenonympha tullia*), and wood nymph (*Cercyonis pegala*) butterflies. Adults of these butterflies also avoided sprayed plots. The formulation Poast® contains a petroleum solvent that has a strong odor, so perhaps this contributed to the avoidance of sprayed plots by butterflies.

Stark, Chen and Johnson (2012) tested the toxicity of triclopyr BEE (in the formulation Garlon 4 Ultra®), sethoxydim (in the formulation Poast®) and imazapyr (in the formulation Stalker®) to Behr’s metalmark butterfly (*Apodemia virgulti*). Larvae were directly sprayed and fed on sprayed food plants. All three herbicide formulations reduced the number of individuals reaching the pupae stage. If larvae did reach the pupae stage, there was 100% emergence to the adult stage. For Garlon 4 Ultra®, pupae weight was significantly larger and adult abdomen length significantly longer than controls. Poast® and Stalker® did not affect other parameters measured. The authors suggest that the effects were likely caused by the inert ingredients or combinations of inert ingredients, or effects of the formulations on food plant quality because the herbicide active ingredients tested all have different modes of action (Stark, Chen, and Johnson 2012).

For chlorsulfuron and metsulfuron methyl, Kjaer and Heimbach (2001) evaluated survival and growth of the large white butterfly (*Pieris brassicae*) when host plants were treated for four consecutive days. Rates applied were up to 0.8 g ai/ha (about 0.0007 lb/ac) for chlorsulfuron (in the formulation Glean®), and up to 0.003 lbs a.i./acre for metsulfuron methyl (in the formulation Ally®)(all European formulations). No significant effects on survival or growth rate occurred for either herbicide (Kjaer and Heimbach 2001). Using data from other insects, the FS risk assessments for chlorsulfuron and metsulfuron (SERA 2004a,b) concluded that there were no likely adverse effects to invertebrates at typical and maximum application rates used by the FS.

There is apparently no data for effects to butterflies for clopyralid, or impazapic, or sulfometuron methyl. Using the honey bee and/or other insect data as a surrogate for butterflies, clopyralid, imazapic, and sulfometuron methyl do not appear to pose a risk from typical or highest application rates.

Sucoff et al. (2001) studied effects of herbicides on host plants, eggs and larvae of the Karner blue butterfly (*Lycaeides Melissa*) from treatments with glyphosate, glyphosate-sulfometuron methyl mix and glyphosate-triclopyr mix. Treatment did not inhibit flowering of the larval food plant, whereas glyphosate, triclopyr, and glyphosate-sulfometuron methyl mix treatments did not significantly reduce egg hatching, pupation of larvae, and emergence of adults, pupae size, or rate of development of percent of eggs that produced adults. While glyphosate-triclopyr mix did significantly reduce egg hatching, with implementation of pdf (F2) restricting application rates of these herbicides, no toxic exposures are anticipated. Effects are further reduced when you consider that triclopyr is not among the first-choice herbicides in any alternative and is restricted to spot application.

Effects on populations in field applications may be different than individual toxicity tests. Bramble et al. (1997) conducted a series of studies on the effects of using commercial formulations of herbicides (including glyphosate, picloram, triclopyr, and metsulfuron methyl with various surfactants) in rights-of-way maintenance, compared with mechanical maintenance and observed no significant or substantial differences in butterfly populations.

The likelihood that individuals would be affected by herbicides depends on the likelihood that host plants would be affected or that they would be contaminated by drift. Implementation of pdf J6-a, will ensure that buffers would be implemented on any sites that contain host/nectar plants, reducing the likelihood of herbicide exposure or mortality to host plants. Additionally, J6-b requires that treatment in occupied habitat be coordinated with a biologist, so that the type or timing of treatment can be modified if necessary to reduce potential impacts. Also use of ester formulations of herbicide in known silver-bordered fritillary habitat would be prohibited. Although data is limited, with implementation of project design features to protect suitable host plants and occupied sites, considering the small amount of suitable habitat proposed for treatment (less than1 percent of the suitable habitat affected), and considering the low risk of preferred herbicides, it is unlikely that adverse effects from herbicide exposure would occur to adults, pupae or eggs under any alternative.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. This species occupies non-forested riparian/wetland habitat, so other than continued grazing and recreational use, few of the anticipated ongoing and future activities would occur within suitable habitat. Also LRMP standards are in place to protect/maintain suitable wet meadow habitat. Since they are known to occupy adjacent private land, it is possible that adults could be exposed to herbicides on multiple ownerships. The toxicity of proposed herbicides to invertebrates is low and pdfs on NFS lands further reduce the likelihood of multiple herbicide exposures. As a result and considering the small amount of habitat proposed for treatment within any watershed, it is unlikely that treatment on National Forest System land would result in toxic levels of herbicides to adult butterflies or measurably contribute to any other past, on-going or future activity and result in significant effects to this species.

Summary and Determination

Silver bordered fritillary is not documented within the project area, although it is documented adjacent to the Malheur National Forest so use on the Forest is likely. Based on the above analysis and the following rationale, invasive plant treatments in any of the action alternatives "**may impact individuals or habitat" (MIIH), but are not likely to lead to a trend toward federal listing**" for the silver-bordered fritillary.

- Within occupied habitat, project design features are in place that would protect host/nectar plants, and minimize the likelihood of adverse effects from treatment.
- Based on available data and with implementation of project design features, it is unlikely that proposed herbicides would adversely affect terrestrial invertebrates.

- Approximately 35 acres of preferred habitat are proposed for treatment (including 20 acres of spot application). Due to small amount of habitat affected and with pdfs that modify treatment type and timing, it is unlikely an occupied site would be affected.
- Proposed treatments would reduce invasive plants and help to maintain native riparian grassland habitat.

Effects on Management Indicator Species

Table 24: Treatment Effects Determinations for Management Indicator Species (MIS)

<table>
<tr><th>Species</th><th>Treatment Effects Determination</th></tr>
<tr><td>Rocky Mountain Elk</td><td>Treatment effects limited to short term disturbance. Herbicide exposure unlikely. Grassland habitat and local elk populations maintained. Implementation of any of the action alternatives would not contribute to a negative trend in viability for this species within the MNF.</td></tr>
<tr><td>Pine marten</td><td>Not likely to occur in treatment areas. Suitable habitat and local populations maintained. Implementation of any of the action alternatives would not contribute to a negative trend in viability for this species within the MNF.</td></tr>
<tr><td>Pileated woodpecker</td><td>No treatment or herbicide effects to nesting birds. Disturbance to foraging birds possible. No herbicide exposure anticipated. Suitable habitat and local populations maintained. Implementation of any of the action alternatives would not contribute to a negative trend in viability for this species within the MNF.</td></tr>
<tr><td>Three-toed woodpecker</td><td rowspan="2">No treatment effects to nesting birds. Disturbance to foraging birds possible. No herbicide exposure anticipated. Suitable habitat and local populations maintained. Implementation of any of the action alternatives would not contribute to a negative trend in viability for this species within the MNF.</td></tr>
<tr><td>MIS cavity excavators</td></tr>
</table>

Rocky Mountain Elk

Approximately 2,124 acres of elk summer range is currently infested with invasive plants. Of this, approximately 1,860 acres (88 percent) are adjacent to open roads. While there are no invasive plant treatments proposed within elk calving areas, approximately 517 acres of the elk winter range are currently known to contain invasive plant species. Treatment would occur across 100 watersheds (HUC 6) ranging in size from 10,000 to 40,000 acres. While six watersheds have 100 acres or more proposed for treatment (120 to 170 acres), one percent or less of all watersheds would be treated.

Direct and Indirect Effects

Treatment

Because elk are sensitive to human disturbance, proposed treatments can adversely affect big game due to disturbance and increased human access. About 88 percent of proposed treatments are close to open roads, which makes these areas less likely to be used as habitat (Thomas 1979). Also treatment within any drainage would be short-term in nature (a few days) and unaffected habitat is available. Also with implementation of the following design features, the likelihood of disturbance during sensitive or key periods would be reduced:

- Pdf J12-a - In order to reduce stress during the winter, restrict off-highway vehicle use within MA 41 (big game winter range) between December 1st and April 1st.

- Pdf J12-b - To prevent harassment in designated calving areas, restrict off-highway vehicles and other motorized traffic use to designated roads and trails from May 1st to June 31st.

Invasive plants can reduce the ability of an area to support elk and result in a loss of forage quality and quantity for big game (Rice et al. 1997, Bedunah and Carpenter 1989, Trammel and Butler 1996). As a result treatment of invasive plants would beneficially affect elk (and deer) by preserving native forage species and maintaining the long-term suitability of foraging habitat.

Herbicides

Mammals such as elk that eat vegetation (primarily grass) that has been sprayed with herbicide have relatively greater risk for adverse effects because herbicide residue is higher on grass than it is on other herbaceous vegetation or seeds (Kenaga, 1973, Fletcher et. al. 1994, Pfleeger et. al. 1996).

At the highest application rates, glyphosate and picloram exceeded levels of concern at acute exposures, whereas a chronic exposure of concern resulted from sethoxydim applied at the highest rate and triclopyr at the typical and highest rates. The likelihood of exposure is reduced because triclopyr is restricted to spot techniques, pdf F2 prevents glyphosate and picloram from being broadcast sprayed above typical application rates, and pdfs H3/H4 restrict use of picloram on sensitive soils and frequency of application. The likelihood of exposure is further reduced when considering that elk forage over large areas and are not likely to consume an entire days diet of contaminated vegetation (acute exposure) or forage exclusively on contaminated vegetation for 90 days (chronic exposure). As a result and considering that 88 percent of the proposed treatments occur close to open roads which are less likely to be used by elk (Thomas 1979) it is unlikely that elk would be adversely affected by herbicide exposure.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. As described, ongoing and future activities would be implemented on 60 watersheds forestwide. Proposed timber harvest would reduce elk cover, although Forest LRMP standards related to habitat effectiveness, hiding and thermal cover would be adhered to. Also much of the harvest, as well as prescribed fire and plantation thinning would improve elk forage on summer, winter and transition ranges. As a result and considering that proposed treatments would help to maintain native forage over the long term, elk habitat would be maintained in all affected watersheds. While proposed treatments could increase disturbance to elk on summer range, effects would be short term. As a result and considering that 88 percent of proposed treatments occur close to roads where elk are less likely to occur, there are no long-term disturbance related effects anticipated.

Because elk utilize all ownerships, anticipated cumulative effects include possible exposure to herbicides on state, private and BLM land. For adverse effects from herbicide exposure to occur, the two exposures would have to occur at approximately the same time. This is unlikely since the herbicides proposed are rapidly eliminated and do not significantly bio-accumulate (USDA Forest Service 2005a). The risk of herbicide exposure over a level of concern would be avoided by implementation of pdfs that restrict herbicide application rates, provide herbicide-use buffers along streams, waterbodies, springs and riparian areas, and minimize drift from broadcast application. The risk of exposure is further reduced when you consider that 1 percent or less of any watershed would be affected by treatment and that most treatment occurs in less preferred habitat adjacent to open roads. Collectively for these reasons, none of the alternatives would measurably contribute to any other past, current or foreseeable activity related to herbicide exposure and there are no significant cumulative effects to elk anticipated.

Summary and Determination

There are no adverse effects from herbicide exposure anticipated. While proposed treatments may result in short-term disturbance during treatment, treatment would reduce invasive plants and help to maintain native big game range. As a result local populations of elk and hunting opportunities would be maintained Implementation of the action alternatives would not contribute to a negative trend in viability for elk on the Malheur National Forest.

American Marten

Direct, Indirect and Cumulative Effects

Because marten prefer closed canopy forest away from open roads (where 88 percent of proposed treatment sites are), it is unlikely they would occur in treatment sites. Also invasive plant treatments would not alter forested habitat. As a result and considering no herbicide exceeded a level of concern for carnivores eating contaminated small mammals, proposed treatments would not adversely affect marten or alter their habitat under any alternative.

Summary and Determination

There are no direct, indirect or cumulative effects to marten anticipated and implementation of the action alternatives would not contribute to a negative trend in viability for this species on the Malheur National Forest.

Cavity Nesters and Species Dependent on Downed Wood

Because they occupy similar habitats and have similar threats, cavity nesting species or species that require standing dead (snags) and downed woody debris are discussed collectively. In addition to the Lewis' and white-headed woodpeckers discussed previously, these species include; pileated woodpecker, northern three-toed woodpecker, northern flicker, red-naped sapsucker, red-breasted sapsucker, Williamson's sapsucker, downy woodpecker, hairy woodpecker, and black-backed woodpecker.

Direct and Indirect Effects

Treatment

Because no snags or trees would be removed nest habitat would be unaffected, although disturbance to foraging birds would occur, particularly species such as the pileated woodpecker or northern flicker that forage on the ground or in more open canopy conditions. Because sites are small and scattered, unaffected habitat is available and effects would be limited to short-term disturbance during treatment. Cavity nesting species are not at risk from herbicides and existing habitat would be unchanged.

Herbicides

Species that forage and nest in trees are not likely to be exposed to herbicides because woody vegetation would not be treated and no aerial application is proposed. Species such as the pileated woodpecker and northern flicker that feed on the ground or in low shrubs may consume contaminated insects.

Effects of herbicide exposure are the same as those described under the Lewis' and white-headed woodpecker. As described, with implementation of pdfs the likelihood of herbicide exposure is reduced. The likelihood of exposure is further reduced when you consider that birds forage over large areas and that many of the insects utilized occur within dead wood, under bark or are taken from areas not exposed to herbicides. As a result birds are not likely to consume exclusively contaminated insects and there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative Effects

Ongoing/future project and alternative cumulative effects are discussed above. These species could be affected by any activity that reduces snags or downed wood, or modify the overstory, particularly timber harvest and prescribed burning. As discussed under alternative cumulative effects, timber harvest and invasive plant treatments would occur within 39 watersheds, which include approximately 1,100 acres of treatment. While timber harvest would reduce habitat for some species due to reductions in the overstory, habitat for others would be improved. With implementation of Forest standards, a component of snags and downed wood would be retained on all sites. As a result, and considering the proposed treatments would not modify suitable habitat and that there are no adverse effects from herbicide exposure anticipated, none of the alternatives would measurably contribute to any other past, current or foreseeable activity and there are no significant cumulative effects to snag or downed wood dependent species anticipated.

Summary and Determination

Approximately 950 acres of suitable habitat for MIS and sensitive cavity nesting species overlap with mapped infestations proposed for treatment. It is unlikely nesting birds would be affected and any disturbance to foraging birds would be short-term (usually one day or less). Suitable nesting habitat would be unaffected by treatment and implementation of the action alternatives would not contribute to a negative trend in viability for cavity nesting or downed wood dependent species on the Malheur National Forest.

Effects to Featured Species

California Bighorn Sheep

Direct and Indirect Effects

Treatment

Less than 14 acres of bighorn sheep habitat is proposed for treatment and the likelihood of disturbance is remote. Should future treatments be proposed within occupied habitat, treatment modifications/timing would be made if necessary during preparation of annual prescriptions to ensure sheep are not disturbed. Due to the small amount of habitat known to contain invasive plants suitable habitat would be unchanged.

Herbicides

Effects from herbicide exposure would be similar to those described under elk. With implementation of pdfs and considering the small amount of habitat proposed for first year treatment, sheep are not likely to consume exclusively contaminated vegetation and there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Other than grazing and recreation, there are few on-going/future activities within suitable habitat anticipated. As described under alternative cumulative effects, it is not anticipated that grazing use will change, and bighorn forage conditions would be maintained. As a result, and considering the small amount of habitat proposed for treatment, and low likelihood of herbicide exposure, none of the alternatives would measurably contribute to any other past, current or foreseeable activity and there are no significant cumulative effects anticipated.

Summary and Determination

Due to the small amount of habitat proposed for treatment and considering that are no adverse effects from herbicide exposure, local populations of bighorn sheep and there habitat would be maintained under all alternatives.

Northern Goshawk

Direct and Indirect Effects

Treatment

There are 567 acres of nesting/foraging habitat and 18 acres within post fledgling habitat proposed for treatment. While more open canopy habitat is proposed for treatment, northern goshawk prefers closed-canopy mature forest for nesting and foraging, therefore, its habitat is not at risk from invasive plants. As a result, and with implementation of pdf J11-a, that restricts activity within 0.50 mile of known nest sites, there are no effects to nesting goshawks anticipated. Foraging goshawks could be disturbed during treatment, although unaffected habitat is available and any disturbance would be short-term. Proposed treatments would not alter existing habitat.

Herbicides

At the typical application rate, no herbicide or surfactant exceeded the toxicity index for an acute or chronic exposure, whereas sethoxydim equaled the NOAEL at the highest application rate. Project design feature F2 restricts broadcast application of sethoxydim to the typical application rate. As a result and considering that goshawk forage over large areas and are unlikely to feed exclusively on contaminated prey, there are no adverse effects from herbicide exposure anticipated.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. While activities such as harvest and fire would modify goshawk nesting and foraging habitat, LRMP standards would protect nest sites and PFA areas, whereas stand and landscape level prey diversity would likely increase. Similarly plantation thinning and reforestation treatments would increase understory and prey diversity. While there would be some road use changes resulting from access and travel management, with implementation of plan standards, nest habitat would be maintained. Mineral exploration could result in a long-term reduction in nest habitat, whereas short-term disturbance could occur from future structural or in-stream restoration work. Disturbance from recreation would continue, although high use areas would continue to be avoided. While there may be a localized reduction in habitat from some ongoing/future activities, most anticipated activities would maintain nest habitat and maintain or improve foraging habitat. As a result and considering proposed actions would not modify habitat or result in adverse effects from herbicide exposure, none of the alternatives would measurably contribute to any other past, current or foreseeable activity and there are no significant cumulative effects anticipated.

Summary and Determination

Suitable goshawk habitat would be maintained and any effects from treatment would be minor and short-term. Local populations of northern goshawk and their habitat would be maintained under all alternatives.

Blue Grouse

Direct and Indirect Effects

Treatment

Blue grouse winter at upper elevations and winter habitat is largely unaffected by invasive plants or treatment. They breed within openings at lower elevations and treatments within open canopy forest and grassland/shrub habitats near forest could disturb grouse, or result in mortality to nests or chicks. There are approximately 125 acres proposed for treatment in mountain meadow, step shrublands or riparian/shrub habitats. Due to the small size of treatment sites and widespread availability of unaffected habitat the likelihood of adverse impacts is low. This species is not at risk from invasive plants and suitable winter and summer habitat would be unchanged.

Herbicides

Because adult blue grouse forage primarily on shrubs and herbaceous vegetation during the summer months and chicks consume large quantities of insects, risk of effects from herbicide exposure was evaluated using the insectivorous bird scenario, as well as a large bird consuming vegetation.

For adult birds and chicks at typical application rates, only triclopyr (if broadcast sprayed) exceeded the acute toxicity thresholds, whereas glyphosate exceeded a dose of concern at the highest rate for small birds consuming insects. Triclopyr is restricted to spot techniques, whereas pdf F2 limits broadcast spray of glyphosate and triclopyr to the typical rate (or less for triclopyr). As a result, it is unlikely that adult birds or chicks would receive an acute exposure of concern.

Chronic exposures were also evaluated and at the typical application rate for large birds consuming vegetation triclopyr exceeded a dose of concern, whereas sethoxydim, sulfometuron methyl, glyphosate and triclopyr exceeded the toxicity threshold at the highest application rate. With implementation of pdf F2 that restricts broadcast application of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl and triclopyr to typical application rates (or less for triclopyr) and the Malheur National Forest LRMP standard that prevents broadcast application of triclopyr, the likelihood of exposure is reduced. Triclopyr is not a first-choice herbicide in any alternative. As a result and considering the small size and scattered nature of treatments sites, birds would not be expected to forage exclusively on contaminated insects or plants and be exposed to herbicides at levels of concern.

Cumulative Effects

Approximately 125 acres of summer habitat could be affected by treatment. Future timber harvest is unlikely to adversely affect forested riparian and upland shrub habitats due to changes in overstory and understory vegetation. While prescribed burning could result in short-term impacts to understory vegetation, treatment would promote the maintenance of shrub diversity over the long-term. Similarly, proposed treatments would help to reduce invasive plants and maintain native shrub, grass and forb diversity. None of the alternatives would measurably contribute to any other past, current or foreseeable activity and result in significant cumulative effects.

Summary and Determination

Proposed activities would not modify suitable habitat and no long-term effects from treatment are anticipated. As a result, suitable habitat and local populations of blue grouse would be maintained.

Osprey

Direct and Indirect Effects

Treatment

There are no known osprey nests on the MNF, whereas pdf J11-a protects osprey nests should one become established in the future, thus, there would be no effects to nesting birds or reproduction. Osprey forage and nest over standing water, thus, neither birds nor their habitat would be affected by treatment.

Herbicides

While osprey would not be directly sprayed, they could consume fish exposed to herbicides. Doses were estimated assuming that birds ate nothing but fish contaminated by a spill of 200 gallons into a 0.25 acre pond, over a lifetime. All expected doses to fish-eating birds for all herbicides are well below any known no-observable-adverse-effect-level (NOAEL) and the weight of evidence suggests that adverse effects to this species group from herbicides included in the action alternatives are not plausible.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Because osprey nest and forage exclusively over water, anticipated activities on NFS lands are not expected to adversely affect osprey. While birds could be exposed to herbicides on multiple ownerships, for adverse effects to occur, the two exposures would have to occur at approximately the same time. This is unlikely since the herbicides proposed are rapidly eliminated and do not significantly bio-accumulate (USDA Forest Service 2005a). Also with implementation of pdf's that limit the application rate, method and frequency for moderate to higher-risk herbicides, provide herbicide buffers along streams, waterbodies and riparian areas, and minimize drift from broadcast application, the risk of herbicide exposure is further reduced. As a result, none of the alternatives would measurably contribute to any other past, current or foreseeable activity related to herbicide exposure and there are no significant cumulative effects to osprey anticipated.

Summary and Determination

Osprey and their habitat would be unaffected by invasive plants or proposed treatments and local populations would be maintained.

Pronghorn Antelope

Direct and Indirect Effects

Treatment

Approximately 122 acres of invasive plants would be treated within sagebrush habitat adjacent to private lands and suitable pronghorn habitat. This would occur across 25 watersheds with 70 (alternative B) to 83 (alternative D) percent of the herbicide application occurring as spot treatment. Under alternative C, 75 percent of the treatments would be with manual/mechanical methods.

Although pronghorn occupy more open habitat, the potential effects of invasive plant treatment to pronghorns would be similar to those discussed under the rocky mountain elk. Both species graze herbaceous plants, graze over large areas and are sensitive to human disturbance. Direct effects would be limited to short-term disturbance during treatment. Because treatments would contain or control invasive plants, pronghorn habitat would be maintained under all action alternatives.

Herbicides

Effects of herbicide use would be the same as those described for elk. While exposures of concern are possible, with implementation of the Malheur National Forest LRMP standard that restricts use of triclopyr to selective/spot techniques and pdf F2 that prevents glyphosate and triclopyr from being broadcast sprayed above typical application rates, the likelihood of exposure is reduced. As a result and considering that pronghorn forage over large areas are not likely to consume exclusively contaminated vegetation, it is unlikely that antelope would be adversely affected by herbicide exposure.

Cumulative Effects

On-going/future projects and alternative cumulative effects are discussed above. Future activities that could affect pronghorn include grazing, livestock water development, and juniper management. While disturbance from water development and juniper management could occur, habitat would be maintained. While continued grazing could reduce forage, use is not expected to change and livestock would be deferred following treatment if necessary to ensure establishment of native vegetation. As a result suitable pronghorn habitat would be maintained. While animals could be exposed to herbicides on other ownerships, as described under the alternative cumulative effects and elk, there are no adverse effects from herbicide exposure anticipated, and none of the alternatives would measurably contribute to past, current or foreseeable activity and result in significant cumulative effects.

Summary and Determination

While proposed treatments may result in short-term disturbance during treatment, sagebrush habitat would be maintained or improved and there are no adverse effects from herbicide exposure anticipated. As a result, local populations of pronghorn would be maintained.

Effects to Birds of Conservation Concern

This section evaluates effects to landbirds, birds of conservation concern and game birds below desired condition. Table 25 displays species not evaluated previously and groups species into similar feeding strategies for analysis.

Table 25: Exposure Groups, Habitat and Species Included in Each Group.

Animal/Diet Group	Habitat	Species
Predatory Birds (small mammal)	Grassland, Shrub-steppe, Dry Forest, Juniper-steppe, Rimrock-cliff	Swainson's hawk, Prairie falcon, Burrowing Owl, Ferruginous hawk, Flammulated Owl
Insectivorous Birds	Dry Forest, Mesic Mixed Conifer, Riparian Woodland and Shrub, Shrub-steppe, Alpine, Sagebrush, Juniper Woodland, open water/wetland.	Chipping sparrow, Vaux's swift, Townsend's warbler, varied thrush, MacGillivay's warbler, red-eyed vireo, veery, willow flycatcher, hermit thrush, vesper sparrow, gray-crowned rosy finch, loggerhead shrike, lark sparrow, black-throated sparrow, Bullock's oriole, yellow warbler, yellow-breasted chat, yellow-billed cuckoo, Lazuli bunting, gray flycatcher, Virginia' warbler, Yellow-billed cuckoo, Olive-sided flycatcher, sage sparrow, Brewer' sparrow, sage thrasher, sage sparrow, Black swift, Calliope hummingbird, Williamson's sapsucker, McCown's longspur, Black rosy finch, Cassins finch, Long billed curlew.
Herbivorous bird	Shrub-steppe	Sharp-tail Grouse,
Waterfowl	Wetlands, riparian areas and open water habitats	Canvasback, ring-necked duck, wood duck, mallard, northern pintail, redhead, lesser scaup, American wigeon

Predatory Birds

Direct, Indirect and Cumulative Effects

With implementation of pdf J11-a, raptor nests would be protected and there are no adverse effects to nesting birds or reproduction anticipated under any alternative. LRMP standards are also in place to protect hawk and owl nests from other management activities. While foraging birds could be affected, the short-term (one day or less), low magnitude, and limited extent (usually 1 acre or less scattered over larger areas) of disturbance that could occur with invasive plant treatments would not adversely affect species in this group.

Effects of herbicide exposure would be similar to those described for northern goshawk and peregrine falcon and as described, there are no adverse effects from herbicide exposure anticipated.

Cumulative effects would be similar to those described under Northern goshawk.

Insectivorous Birds

Direct, Indirect and Cumulative Effects

Effects to these species will vary and there would be little effect to forested species such as the Townsend's warbler that utilize closed-canopy forest and nest off the ground. For species such as the veery or Brewer's sparrow which nests on or near the ground or in shrubs, effects include possible mortality associated with trampling of the nest. Due to the small size of treatment sites and widespread availability of unaffected habitat, the likelihood of mortality is low. Direct effects also include short-term disturbance during treatment.

Risk of effects from herbicide exposure was evaluated using the insectivorous bird scenario and effects would be similar to those described for the grasshopper sparrow. While use of some herbicides could result in an adverse effect, implementation of the Malheur National Forest LRMP standard that restricts use of triclopyr to spot/selective methods only, and pdf F2 that restricts broadcast application of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl and triclopyr to typical application rates, the likelihood of herbicide exposure is low. Exposure is further reduced when you consider the small and scattered nature of the treatment sites and availability of unaffected habitat, which would reduce the likelihood that birds would forage exclusively on contaminated insects. As a result, there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative effects would be similar to those described under grasshopper sparrow.

Herbivorous Birds

Direct, Indirect and Cumulative Effects

The Columbia sharptail grouse has not been documented on the MNF and there are no direct effects from treatment anticipated. Should future use within treatment sites be documented, necessary treatment modification would be made as part of the annual review and monitoring process and it is unlikely that the Columbia sharp-tailed grouse would be directly affected by herbicide and non-herbicide treatment. While all alternatives would control invasive plants within sagebrush communities, because it has the widest range of treatment options, alternative B would be the most effective, particularly with larger infestations.

Effects from herbicide exposure would be similar to those described under sage grouse. For adult birds consuming vegetation and chicks consuming insects, only triclopyr (if broadcast sprayed) exceeded the acute toxicity threshold at typical and highest application rates, whereas glyphosate exceeded a dose of concern at the highest rate for small birds consuming insects and large birds consuming vegetation. Because triclopyr is restricted to spot application and with implementation of pdf F2 that limits both herbicides to typical application rates (less for triclopyr), it is not expected that adult birds or chicks would receive an acute exposure of concern.

For chronic exposures to adult birds, triclopyr exceeded a dose of concern at the typical and highest application rate, whereas sethoxydim, sulfometuron methyl and glyphosate exceeded the toxicity threshold at the highest application rate. Data is lacking to evaluate a chronic exposure of clopyralid, glyphosate, picloram, sethoxydim, sulfometuron methyl and triclopyr on small birds consuming insects. While exposure from these herbicides are possible, when you consider that; 1) pdf F2 restricts broadcast application of clopyralid, glyphosate, picloram, sethoxydim and sulfometuron methyl to typical application rates (and all use of triclopyr to typical rates), 2) triclopyr is restricted to spot techniques, 3) the use and frequency of picloram is restricted (H3 and H4), 4) the small amount of habitat proposed for treatment that is scattered across 20 watersheds, and 4) that birds would be unlikely to consume 100 percent of their diet from contaminated insects/vegetation for 90 days and receive a chronic dose of concern, there are no adverse effects from herbicide exposure anticipated under any alternative.

Cumulative effects would be similar to those described under sage grouse and upland sandpiper.

Waterfowl

Direct, Indirect and Cumulative Effects

While all alternatives would help to contain and control invasive plants, because treatments proposed under alternatives C and D are less effective, treatment effectiveness of invasive plants within wetland and riparian habitat would best be achieved under alternative B. Risk of disturbance is also greater under alternatives C and D because more repeated treatments may be necessary and the increased use of greater use of spot herbicide application and manual/mechanical treatments.

Disturbance to waterfowl could occur under any alternative from herbicide or non-herbicide methods. With implementation of herbicide use buffers if necessary, retention of untreated areas near water (H7-H9) and considering the small and scattered nature of treatment sites within suitable habitat, the likelihood of direct effects to nesting birds is low.

The diet of these species varies and while species such as the redhead eat primarily plant material, the canvasback, ring-necked duck, mallard, pintail, lesser scaup and American widgeon eat a combination of plant and insects. Also some species such as the wood duck and pintail eat vegetation or insects away from water within woodlands or open habitat. As a result, effects of herbicide exposure to waterfowl were evaluated using the insectivorous and herbaceous eating bird scenarios, as well as by evaluating the likelihood that aquatic organisms would be affected.

Effects to aquatic invertebrates and plants were evaluated under the fisheries analysis and as described, concentrations of herbicides potentially delivered to any water body on the MNF would remain well below levels capable of measurably affecting aquatic organisms, including: fishes, amphibians, or aquatic invertebrates. Herbicide exposures to birds consuming insects or plant material would be similar to those described above (i.e. insectivorous and herbivorous birds) and the following pdfs reduce the likelihood that waterfowl would be exposed to toxic levels of herbicide.

- The MNF Plan restricts use of triclopyr to selective and spot techniques only.
- Project design feature F2 restricts broadcast application of clopyralid, glyphosate, picloram, sethoxydim and sulfometuron methyl to typical application rates, whereas triclopyr is restricted to the typical application rate per acre or less.
- Project design features H3 and H4 restrict the use and frequency of application of picloram.
- Project design features (H1, H2, H5, and H8-H10) would reduce the likelihood for herbicides to be delivered to wetlands, lakes, ponds, wells, springs or stock tanks.

- Restrictions on extent of treatment in a given site (H4, H5 and H7) ensure that herbicides would not be delivered in amounts greater than the SERA risk assessment scenarios and that unsprayed areas around wetlands, lakes and ponds would be retained.

The likelihood of exposure to herbicide would be further reduced because of herbicide-use buffers and the application of pdfs around streams, wetlands, lakes, ponds, intermittent and ephemeral streams. Collectively, these measures in combination with the use of low risk first year/first choice herbicides will greatly reduce the likelihood that waterfowl would be exposed to toxic levels of herbicide. As a result, and considering that birds would unlikely forage exclusively on contaminated prey/plant material, there are no adverse effects from herbicide exposure anticipated.

Cumulative effects would be similar to those discussed under bufflehead and osprey.

Migratory Bird Summary

Migratory birds and their habitats including species with viability concern (TES), regional landbirds, birds of conservation concern and gamebirds below the desired condition were evaluated. While short-term effects to some migratory bird species may occur, the likelihood of mortality is low. Mitigation measures have been included to reduce effects and there are no long-term adverse effects from treatment anticipated, nor is it likely that migratory birds would be exposed to toxic levels of herbicide. There would be no reduction in native vegetation and all alternatives would help to reduce invasive plants and maintain migratory bird habitat. All action alternatives are consistent with the Migratory Bird Treaty Act and Executive Order 13186.

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